

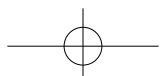
Practice Book for Mathematics

Answer Book

Grade 4



Japan International
Cooperation Agency



1 - 1 Numbers Greater than a Hundred Million
How to Express Numbers (1)

Instruction Above the Ten Millions Place, there are the "Hundred Millions Place," "One Billions Place," "Ten Billions Place," and "Hundred Billions Place".

Hundred Billions Place	Ten Billions Place	One Billions Place	Hundred Millions Place	Ten Millions Place	One Millions Place	Hundred Thousands Place	Ten Thousands Place	One Thousands Place	Hundreds Place	Tens Place	Ones Place
1	0	0	0	0	0	0	0	0	0	0	0

For example, 7676965000* can be read as "seven billion, six hundred seventy-six million, nine hundred sixty-five thousand."
(*World population, 2021)

Example Write the following number in the table and read it.
4 | 65 | 32000* <tons> (*World crude oil production, 2020)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		4	6	5		3	2	0	0	0	

Four billion, one hundred sixty-five million, one hundred thirty-two thousand.

Write the following numbers in the table and read it.

1 4006737000* <tons> (*World oil consumption, 2020)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		4	0	0	6	7	3	7	0	0	

Four billion, six million, seven hundred thirty-seven thousand.

2 13497299000* <ha> (*World land area, 2019)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
	1	3	4	9	7	2	9	9	0	0	

Thirteen billion, four hundred ninety-seven million, two hundred ninety-nine thousand.

1 - 2 Numbers Greater than a Hundred Million
How to Express Numbers (2)

Example The following number represents the world population (2021). Write the number in the table and read it.

In many countries, the comma (,) or space are added every three digits to make it easier to read, like 7,676,965,000 or 7 676 965 000.

7676965000

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		7	6	7	6	9	6	5	0	0	0

Seven billion, six hundred seventy-six million, nine hundred sixty-five thousand.

The following numbers show the population of countries with the largest population in the world (2021). Write the numbers in the table and read them.

1	China	1439300000	<people>
2	India	1380000000	<people>
3	America	331000000	<people>
4	Indonesia	223510000	<people>
5	Pakistan	220920000	<people>
6	Brazil	212600000	<people>

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
1	China		1	4	3	9	3	0	0	0	0
One billion, four hundred thirty-nine million, three hundred thousand.											
2	India		1	3	8	0	0	0	0	0	0
One billion, three hundred eighty million.											
3	America		3	3	1	0	0	0	0	0	0
Three hundred thirty-one million.											
4	Indonesia		2	2	3	5	1	0	0	0	0
Two hundred twenty-three million, five hundred ten thousand.											
5	Pakistan		2	2	0	9	2	0	0	0	0
Two hundred twenty million, nine hundred twenty thousand.											
6	Brazil		2	1	2	6	0	0	0	0	0
Two hundred twelve million, six hundred.											

1 - 3 Numbers Greater than a Hundred Million
How to Express Numbers (3)

Example Write the following number in numerals in the table.

One billion, seventy-nine million, two hundred fifty-two thousand, eight hundred eighty*. <km> (*The distance light travels in one second)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		1	0	7	9	2	5	2	8	8	0

Write the following numbers in numerals.

1 Two hundred sixty-one million, two hundred thousand* <people> (*The population of Nigeria is the 7th largest population in the world, 2021)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
			2	6	1	2	0	0	0	0	0

2 Eight billion, two hundred eighty-three million, three hundred thousand* <people> (*Number of mobile phone subscribers worldwide, 2021)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		8	2	8	3	3	0	0	0	0	0

3 One billion, six hundred fifty-three million, one hundred thousand* <km> (*The estimated distance between the Earth and Saturn)

Hundred Billions	Ten Billions	One Billions	Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones
		1	6	5	3	1	0	0	0	0	0

1 - 4 Numbers Greater than a Hundred Million
Structure of Large Numbers (1)

Example Write the numbers in the . Focus on each individual number. Otherwise, there could be many answers.

- 240000000 is made of hundred millions and ten millions.
- is made of 3 one billions, 4 hundred millions, 5 ten millions, seven one millions.

Write the numbers in the . Focus on each individual number. Otherwise, there could be many answers.

- 453000000 is made of hundred millions, ten millions, and one millions.
- 6520700000 is made of one billions, hundred millions, ten millions and hundred thousands.
- 32568000000 is made of ten billions, one billions, hundred millions, ten millions and one millions.
- is 8 one billions, 2 hundred millions and 6 one millions.
- is 2 ten billions, 4 one billions, 5 hundred millions, 6 ten millions and 7 ten thousands.
- is 7 hundred billions, 2 ten billions, 2 hundred millions and 5 one millions.



You need to look at the table on the right to solve those problems.

Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
Billions			Millions			Thousands					

4

1 - 5 Numbers Greater than a Hundred Million
Structure of Large Numbers (2)

Instruction It is possible to tell the structure of large numbers by their main units, such as "billions," "millions," and "thousands."

Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
Billions			Millions			Thousands					

For example, the number above is made of 3 one billions, 4 hundred millions, 5 ten millions and 7 one millions.

We can also say that the number is made of 3 one billions and 457 one millions or 3457 one millions.

Example Write the numbers in the .

- 240000000 is made of ten millions.
- is made of 3457 one millions.

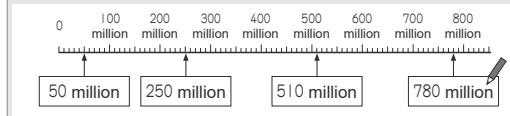
Write the numbers in the .

- 453000000 is made of one millions.
- 6520700000 is made of one billions and one millions and one thousands.
- 32568000000 is made of one billions and one millions.
- is 8 one billions and 206 one millions.
- is 720 one billions and 205 one millions.

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1 - 6 Numbers Greater than a Hundred Million
Number Line

Example Write the numbers in the .



Write the numbers in the . How much does the smallest tick mark show?

- Number line from 0 to 700 million. Labels: million, million, million, million, million, million.
- Number line from 0 to 70 billion. Labels: billion, billion, billion, billion, billion.
- Number line from 0 to 500 billion. Labels: billion, billion, billion, billion, billion.
- Number line from 0 to 10 billion. Labels: billion, billion, billion, billion.
- Number line from 0 to 100 billion. Labels: billion, billion, billion, billion.

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1 - 7 Numbers Greater than a Hundred Million
Structure of Whole Numbers (1)

Example What is 10 times as much as two billion, five hundred million? Then, what is 100 times as much as that number? Read these numbers.

Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
Billions			Millions			Thousands					

10 times the number

100 times the number

When a whole number is increased 10 times as much, its digits move up (to the left) one place.

Write the following number, the number multiplied by 10 and the number multiplied by 100 in the table. Read them.

1 Six billion, seven hundred eighty-nine million

Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
Billions			Millions			Thousands					
Original											
10 times											
100 times											

10 times the number

100 times the number

2 Three hundred four million, five hundred thousand

Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
Billions			Millions			Thousands					
Original											
10 times											
100 times											

10 times the number

100 times the number

7

1 - 8 Numbers Greater than a Hundred Million
Structure of Whole Numbers (2)

Example What is two billion, five hundred million multiplied by $\frac{1}{10}$?

Billions			Millions			Thousands			Hundreds	Tens	Ones
Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
2	5	0	0	0	0	0	0	0	0	0	0
2	5	0	0	0	0	0	0	0	0	0	0



When a whole number is multiplied by 10, its digits move up and to the left one place.

When a whole number is multiplied by $\frac{1}{10}$, its digits move down and to the right one place.

Using the chart, multiply each whole number by 10 and $\frac{1}{10}$.

1 635200000

Billions			Millions			Thousands			Hundreds	Tens	Ones
Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
		6	3	5	2	0	0	0	0	0	0
6	3	5	2	0	0	0	0	0	0	0	0
6	3	5	2	0	0	0	0	0	0	0	0

2 3170256000

Billions			Millions			Thousands			Hundreds	Tens	Ones
Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
		3	1	7	0	2	5	6	0	0	0
3	1	7	0	2	5	6	0	0	0	0	0
3	1	7	0	2	5	6	0	0	0	0	0

1 - 9 Numbers Greater than a Hundred Million
Structure of Whole Numbers (3)

Example Write the following numbers.

- 1 What is 6 billion times 10?
- 2 What is 23 billion times $\frac{1}{10}$?

Write the following numbers.

Be careful about the units for some problems below.



- 1 What is 3 billion times 10?
- 2 What is 28 billion times 10?
- 3 What is 37 billion times 10?
- 4 What is 150 million times 10?
- 5 What is 823 million times 10?
- 6 What is 50 billion times $\frac{1}{10}$?
- 7 What is 7 billion times $\frac{1}{10}$?
- 8 What is 300 million times $\frac{1}{10}$?
- 9 What is 2 million times $\frac{1}{10}$?

1 - 10 Numbers Greater than a Hundred Million
Comparing Numbers

Example Compare the following two numbers and write the appropriate sign (< or >) in the .



It becomes easier when you write the numbers in the table below.

Billions			Millions			Thousands			Hundreds	Tens	Ones
Hundred	Ten	One	Hundred	Ten	One	Hundred	Ten	One	Hundreds	Tens	Ones
2	5	3	9	4	6	0	0	0	0	0	0
1	2	0	3	4	5	6	0	0	0	2	

Compare the following two numbers and write the appropriate sign (< or >) in the .

- 1 562130000 4621300000
- 2 645398720 75239999
- 3 3219865000 3569865000
- 4 678100863645 79921034002
- 5 10388584982 103885849821
- 6 340670890000 2406708900000

Pay attention to how many digits are there in each numbers.



1 - 11 Numbers Greater than a Hundred Million
Multiplication of Large Numbers (1)

Example We played a game of choosing 6 out of 10 cards from 0 to 9 to make two 3-digit numbers, multiplying these numbers and finding the answer. And we made the numbers 356 and 478.

Thousands	Hundreds	Tens	Ones
3	5	6	
4	7	8	

Line up the numbers vertically in each place.

$$356 \times 8 = 2848$$

$$356 \times 7 = 2492$$

(This is actually $356 \times 70 = 24920$)

$$356 \times 4 = 1424$$

(This is actually $356 \times 400 = 142400$)

Do the addition.

$$2848 + 24920 + 142400 = 170168$$

$$356 \times 478 = 170168$$

This seems difficult. However, it can be done by using previous knowledge. That "+" is not necessarily written.



In the above game, we made the following numbers. Write the correct numbers in the .

- 1

Thousands	Hundreds	Tens	Ones
	5	8	2
	3	4	9
- 2

Thousands	Hundreds	Tens	Ones
	6	2	0
	8	5	3

1 - 12 Numbers Greater than a Hundred Million

Multiplication of Large Numbers (2)

Example 1 In the previous game, we made the numbers 542 and 307. How can we calculate 542×307 ?

Line up the numbers vertically in each place.

$$\begin{array}{r}
 542 \\
 \times 307 \\
 \hline
 3794 \\
 0000 \\
 16260 \\
 \hline
 166394
 \end{array}$$

$542 \times 7 = 3794$
 $542 \times 0 = 0$
 $542 \times 3 = 1626$ (This is actually $542 \times 300 = 162600$)
 Do the addition.
 $3794 + 0 + 162600 = 166394$
 $542 \times 307 = 166394$

1 In that game, we made the numbers 937 and 204, and the numbers 789 and 506. Calculate 937×204 and 789×506 .

1 $937 \times 204 = 191148$ 2 $789 \times 506 = 399234$

Example 2 Think about how to calculate 5400×320 .

$5400 \times 320 = 54 \times 100 \times 32 \times 10$
 $= 54 \times 32 \times 100 \times 10$
 $= 54 \times 32 \times 1000$
 $= 1728 \times 1000$
 $= 1728000$

Multiplication of numbers with 0 at the end is calculated by omitting 0. After calculation, 0 is added to the right of the product by the number of 0's omitted.

2 Calculate the following multiplication problems by using the algorithm.

1 $4800 \times 630 = 3024000$ 2 $9400 \times 870 = 8178000$

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1 - 13 Numbers Greater than a Hundred Million

Review

1 Write the following number in the table and read it.

2978982000 <tones>

Billions	Millions	Thousands	Hundreds	Tens	Ones
2	978	982	00	00	00

(World grain production, 2019)
Two billion, nine hundred seventy-eight million, nine hundred eighty-two thousand.

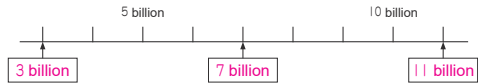
2 Write the following numbers in the numerals in the table. One billion, seven hundred nine million, eight hundred twenty-five thousand.

<ha>

Billions	Millions	Thousands	Hundreds	Tens	Ones
1	709	825	00	00	00

(Russia's land area, the largest land area in the world, 2019)

3 Write the numbers in the \square .



4 Answer the following questions.

1 What is 560 million times 10? **5 billion 600 million (5600000000)**

2 What is 7 billion times $\frac{1}{10}$? **700 million (700000000)**

5 Compare the following two numbers and write the appropriate sign (< or >) in the \square .

1 230569000 < 1120569000

2 1000000000 > 999999999

6 Calculate the following multiplication problems by using the algorithm.

1 $135 \times 709 = 95715$ 2 $5900 \times 280 = 1652000$

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2 - 1 Division Algorithm-1

Division Algorithm (1)

Example Calculate $48 \div 9$.

divisor: 9 dividend: 48

Think of how many 9's is there in a 48. (Divide 48 by 9)

Write the quotient, 5, in the ones place.

Multiply 9 by 5. Write the answer, 45, in the aligned place below 48.

Subtract 45 from 48. The remainder is 3.

$48 \div 9 = 5 R 3$

This "—" is not necessarily written in the algorithm.

Calculate the following division problems by using the algorithm.

1 $37 \div 5 = 7 R 2$ 2 $13 \div 2 = 6 R 1$ 3 $48 \div 9 = 5 R 3$ 4 $65 \div 8 = 8 R 1$

$5 \overline{) 37} = 7 R 2$ $2 \overline{) 13} = 6 R 1$ $9 \overline{) 48} = 5 R 3$ $8 \overline{) 65} = 8 R 1$

5 $25 \div 7$ 6 $38 \div 6$ 7 $19 \div 4$ 8 $22 \div 3$
 9 $30 \div 9$ 10 $49 \div 5$ 11 $73 \div 8$ 12 $41 \div 7$

5 3R4 6 6R2 7 4R3 8 7R1
 9 3R3 10 9R4 11 9R1 12 5R6

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2 - 2 Division Algorithm-1

Dividing Multiples of 10 and 100

Example 1 Calculate $60 \div 3$.

$6 \div 3 = 2$ (10 times)
 $60 \div 3 = 20$ (10 times)

If 6 sheets of paper are divided equally among 3 children, each child will get 2 sheets of paper ($6 \div 3 = 2$).

Now 60 sheets will be divided equally among 3 children. We can think that 6 bundles of 10 sheets will be divided equally among 3 children.

1 Calculate the following division problems.

1 $40 \div 2 = 20$ 2 $90 \div 3 = 30$ 3 $60 \div 2 = 30$
 4 $70 \div 7 = 10$ 5 $240 \div 4 = 60$ 6 $450 \div 5 = 90$
 7 $560 \div 7 = 80$ 8 $300 \div 6 = 50$ 9 $560 \div 8 = 70$

Example 2 Calculate $600 \div 3$.

$6 \div 3 = 2$ (100 times)
 $600 \div 3 = 200$ (100 times)

600 sheets will be divided equally among 3 children. We can think of this as 6 bundles of 100 sheets will be divided equally among 3 children.

2 Calculate the following division problems.

1 $400 \div 2 = 200$ 2 $800 \div 4 = 200$ 3 $900 \div 3 = 300$
 4 $500 \div 5 = 100$ 5 $2700 \div 3 = 900$ 6 $1600 \div 4 = 400$
 7 $2100 \div 7 = 300$ 8 $3000 \div 5 = 600$ 9 $1000 \div 2 = 500$

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2 - 3 Division Algorithm-1

Division Algorithm (2)

Example Calculate $69 \div 3$.

Calculation of the tens place

Divide 6 in the tens place by 3 ($6 \div 3 = 2$).

Write the quotient, 2, in the tens place.

Multiply 3 by 2 ($3 \times 2 = 6$). (This is actually 3×20 .)

Write the answer, 6, in the aligned place below 6.

Subtract 6 from 6.

Write the answer, 0 in the aligned place below 6.

Calculation of the ones place

Bring down the 9 from the ones place.

Divide 9 by 3 ($9 \div 3 = 3$).

Write the answer, 3, in the ones place.

Multiply 3 by 3 ($3 \times 3 = 9$).

Write the answer, 9, in the aligned place below 9.

Subtract 9 from 9.

Write the answer, 0.

$69 \div 3 = 23$

Although "0" is written to understand this calculation easily, this "0" is not necessarily written.

Calculate the following division problems by using the algorithm.

1 $48 \div 2$

2 $93 \div 3$

3 $84 \div 4$

4 $55 \div 5$

5 $63 \div 3$

6 $86 \div 2$

7 $39 \div 3$

8 $48 \div 4$

9 $62 \div 2$

10 $96 \div 3$

11 $44 \div 4$

12 $28 \div 2$

5	21	6	43	7	13	8	12
9	31	10	32	11	11	12	14

2 - 4 Division Algorithm-1

Division Algorithm (3)

Example Calculate $72 \div 3$.

Calculation of the tens place

Divide 7 in the tens place by 3 ($7 \div 3 = 2$ R 1). (This is actually $70 \div 3$.)

Write the quotient, 2, in the tens place.

Multiply 3 by 2 ($3 \times 2 = 6$). (This is actually 3×20 .)

Write the answer in the tens place.

Subtract 6 from 7. (This is actually $70 - 60$.)

Write the answer in the tens place.

Bring down the 2 from the ones place.

Calculation of the ones place

Divide 12 by 3 ($12 \div 3 = 4$).

Write the quotient, 4, in the ones place.

Multiply 3 by 4 ($3 \times 4 = 12$).

Subtract 12 from 12.

$72 \div 3 = 24$

Number of objects in each group: 72 is divided into 60 and 12. Then 60 is divided by 3 and 12 is divided by 3.

Calculate the following division problems by using the algorithm.

1 $68 \div 4$

2 $87 \div 3$

3 $76 \div 2$

4 $96 \div 8$

5 $54 \div 3$

6 $75 \div 5$

7 $96 \div 6$

8 $98 \div 2$

9 $76 \div 4$

10 $84 \div 6$

3	38	4	12	5	18	6	15
7	16	8	49	9	19	10	14

2 - 5 Division Algorithm-1

Division Algorithm (4)

Example Calculate $76 \div 3$.

Calculation of the tens place

Divide 7 in the tens place by 3 ($7 \div 3 = 2$ R 1).

Write the quotient, 2, in the tens place.

Multiply 3 by 2 ($3 \times 2 = 6$). (This is actually 3×20 .)

Write the answer in the tens place.

Subtract 6 from 7. (This is actually $70 - 60$.)

Write the answer in the tens place.

Bring down the 6 from the ones place.

Calculation of the ones place

Divide 16 by 3 ($16 \div 3 = 5$ R 1).

Write the quotient, 5, in the ones place.

Multiply 3 by 5 ($3 \times 5 = 15$).

Write the answer in the aligned place.

Subtract 15 from 16. The remainder is 1.

$76 \div 3 = 25$ R 1

Calculate the following division problems by using the algorithm.

1 $79 \div 3$

2 $94 \div 4$

3 $62 \div 5$

4 $99 \div 2$

5 $89 \div 7$

6 $77 \div 3$

7 $55 \div 2$

8 $86 \div 6$

9 $92 \div 8$

10 $74 \div 5$

3	12	4	49	5	12	6	25
7	R2	8	R1	9	R5	10	R2
7	27	8	14	9	11	10	14
	R1		R2		R4		R4

2 - 6 Division Algorithm-1

Division Algorithm (5)

Example Calculate $83 \div 4$.

Calculation of the tens place

Divide 8 in the tens place by 4 ($8 \div 4 = 2$).

Write the quotient, 2, in the tens place.

Multiply 4 by 2 ($4 \times 2 = 8$). (This is actually 4×20 .)

Subtract 8 from 8. (This is actually $80 - 80$.) It is a 0.

Calculation of the ones place

Bring down the 3 from the ones place.

Divide 3 by 4 ($3 \div 4 = 0$ R 3).

Write the quotient, 0, in the ones place.

The remainder is 3.

$83 \div 4 = 20$ R 3

Calculate the following division problems by using the algorithm.

1 $92 \div 3 = 30$ R 2

2 $41 \div 2 = 20$ R 1

3 $83 \div 4 = 20$ R 3

4 $62 \div 3$

5 $75 \div 7$

6 $98 \div 9$

7 $81 \div 2$

8 $54 \div 5$

9 $91 \div 3$

10 $82 \div 4$

11 $65 \div 6$

5	20	R 2	6	10	R 5	7	10	R 8	8	40	R 1
9	10	R 4	10	30	R 1	11	20	R 2	12	10	R 5

2 - 7 Division Algorithm-1
Checking the Calculation

Example Calculate $76 \div 3$ and then check the answer.

If we calculate $76 \div 3$ using the division algorithm, the answer is 25 R1.

$$\begin{array}{r} \text{Tens} \quad \text{Ones} \\ 2 \quad 5 \\ 3 \overline{) 76} \\ - 6 \\ \hline 16 \\ - 15 \\ \hline 1 \end{array}$$

$76 \div 3 = 25 \text{ R } 1$

$3 \times 25 + 1 = 76$

Divisor \times **Quotient** + **Remainder** = **Dividend**

Check: $3 \times 25 + 1 = 76$

Calculate the following and then check your answers.

1 $73 \div 2 = 36 \text{ R } 1$ 2 $91 \div 2 = 45 \text{ R } 1$ 3 $90 \div 7 = 12 \text{ R } 6$ 4 $80 \div 3 = 26 \text{ R } 2$

Check: $7 \times 12 + 6 = 90$ Check: $3 \times 26 + 2 = 80$

5 $85 \div 6 = 14 \text{ R } 1$ 6 $62 \div 4 = 15 \text{ R } 2$

Check: $6 \times 14 + 1 = 85$ Check: $4 \times 15 + 2 = 62$

7 $76 \div 5 = 15 \text{ R } 1$ 8 $98 \div 8 = 12 \text{ R } 2$

Check: $5 \times 15 + 1 = 76$ Check: $8 \times 12 + 2 = 98$

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2 - 8 Division Algorithm-1
Division Problems (1)

Example There are 50 chocolates. If 3 children share the chocolates equally, how many chocolates will each child get and how many will be left over?

Math sentence: $50 \div 3 = 16 \text{ R } 2$

Answer: 16 R 2. Each child will get 16 chocolates and 2 are left over.

Check: $3 \times 16 + 2 = 50$

1 There are 50 pieces of candy. If 4 girls share the candy equally, how many will each girl get, and how many will be left over?

Math sentence: $50 \div 4 = 12 \text{ R } 2$

Answer: 12 R 2. Each girl will get 12 pieces and 2 are left over.

Check: $4 \times 12 + 2 = 50$

2 If an 85 cm ribbon is cut into pieces measuring 8 cm each, how many pieces can we make in total? How many cm of ribbon will be left over?

Math sentence: $85 \div 8 = 10 \text{ R } 5$

Answer: 10 R 5. We can make 10 pieces and 5 cm will be left over.

Check: $8 \times 10 + 5 = 85$

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2 - 9 Division Algorithm-1
Division Algorithm (6)

Example Calculate $734 \div 5$.

Divide 7 by 5. Write the quotient, 1, in the hundreds place.

Multiply 5 by 1. (This is actually 5×100). Write a 5.

Subtract 5 from 7. (This is actually $700 - 500$). Write a 2.

Bring down the 3 from the tens place.

Divide 23 by 5. Write the quotient, 4, in the tens place. Multiply 5 by 4. (This is actually 5×40). Write a 20.

Subtract 20 from 23. Bring down the 4 from the ones place.

Divide 34 by 5. Write the quotient, 6, in the ones place.

Multiply 5 by 6. Write a 30.

Subtract 30 from 34. The remainder is 4.

$734 \div 5 = 146 \text{ R } 4$

This "—" is not necessarily written in the algorithm. From this section, the "—" is omitted.

Check the answer: $5 \times 146 + 4 = 734$

Calculate the following division problems by using the algorithm.

1 $809 \div 6 = 134 \text{ R } 5$ 2 $991 \div 8 = 123 \text{ R } 7$ 3 $715 \div 3 = 238 \text{ R } 1$ 4 $625 \div 4 = 156 \text{ R } 1$ 5 $174 \text{ R } 3$

6 $873 \div 5 = 174 \text{ R } 3$ 7 $579 \div 2 = 289 \text{ R } 1$ 8 $797 \div 6 = 132 \text{ R } 5$ 9 $175 \text{ R } 1$ 10 $145 \text{ R } 2$ 11 $294 \text{ R } 1$

22

2 - 10 Division Algorithm-1
Division Algorithm (7)

Example Calculate $619 \div 3$.

Divide 6 by 3. Write the quotient, 2, in the hundreds place.

Multiply 3 by 2. (This is actually 3×200). Write a 6.

Subtract 6 from 6. (This is actually $600 - 600$). It is a 0.

Bring down the 1 from the tens place.

Divide 19 by 3. Write the quotient, 6, in the ones place.

Multiply 3 by 6. Write an 18.

Subtract 18 from 19. Write a 1.

The remainder is 1.

$619 \div 3 = 206 \text{ R } 1$

Check the answer: $3 \times 206 + 1 = 619$

Calculate the following division problems by using the algorithm.

1 $923 \div 3 = 307 \text{ R } 2$ 2 $870 \div 8 = 108 \text{ R } 6$ 3 $613 \div 2 = 306 \text{ R } 1$ 4 $547 \div 5 = 109 \text{ R } 2$ 5 $208 \text{ R } 3$

6 $835 \div 4 = 208 \text{ R } 3$ 7 $647 \div 6 = 107 \text{ R } 5$ 8 $107 \text{ R } 3$ 9 $105 \text{ R } 7$ 10 $206 \text{ R } 1$

23

2 - 11 Division Algorithm-1

Division Algorithm (8)

Example Calculate $721 \div 3$.

Divide 7 by 3. Write the quotient, 2, in the hundreds place.

Multiply 3 by 2. (This is actually 3×200) Write a 6.

Subtract 6 from 7. (This is actually $700 - 600$) Write a 1.

Bring down the 2 from the tens place.

Divide 12 by 3. Write the quotient, 4, in the tens place.

Multiply 3 by 4. (This is actually 3×40) Write a 12.

Subtract 12 from 12. (This is actually $120 - 120$) Write a 0.

Bring down the 1 from the ones place.

Divide 1 by 3 ($1 \div 3 = 0 \text{ R}1$). Write the quotient, 0, in the ones place. Write a 0.

Multiply 3 by 0.

Subtract 1 from 0. The remainder is 1.

Check the answer:
 $3 \times 240 + 1 = 721$

Calculate the following division problems by using the algorithm.

1 $812 \div 3$	2 $704 \div 5$	3 $482 \div 4$	4 $845 \div 7$
5 $785 \div 6$	6 $967 \div 8$	7 $871 \div 3$	8 $521 \div 2$
9 $704 \div 5$	10 $922 \div 4$		

1	270 R 2	2	140 R 4	3	120 R 2	4	120 R 5	5	130 R 5
6	120 R 7	7	290 R 1	8	260 R 1	9	140 R 4	10	230 R 2

2 - 12 Division Algorithm-1

Division Algorithm (9)

Example Calculate $214 \div 6$.

Divide 2 by 6. Write a 0 in the hundreds place. (There is no problem if you do not write this 0.)

Multiply 6 by 0. Write a 0.

Subtract 0 from 2. Write a 2.

Bring down the 1 in the tens place.

Divide 21 by 6. Write the quotient, 3, in the tens place.

Multiply 6 by 3. (This is actually 6×30) Write an 18.

Subtract 18 from 21. (This is actually $210 - 180$) Write a 3.

Bring down the 4 in the ones place.

Divide 34 by 6. Write the quotient, 5, in the ones place.

Multiply 6 by 5. Write a 30.

Subtract 30 from 34. The remainder is 4.

Check the answer:
 $6 \times 35 + 4 = 214$

Calculate the following division problems by using the algorithm.

1 $169 \div 6$	2 $367 \div 7$	3 $269 \div 3$	4 $235 \div 6$
5 $263 \div 4$	6 $198 \div 5$	7 $739 \div 8$	8 $598 \div 9$
9 $626 \div 7$	10 $493 \div 6$		

1	28 R 1	2	52 R 3	3	89 R 2	4	39 R 1	5	65 R 3
6	39 R 3	7	92 R 3	8	66 R 4	9	89 R 3	10	82 R 1

2 - 13 Division Algorithm-1

Division Problems (2)

Example 575 sheets of coloured paper are divided equally among 4 people. How many sheets of paper will each person get? How many sheets of paper are left over?

Math sentence $575 \div 4$

Answer 143 R 3.
Each person will get 143 sheets and 3 are left.

Check $4 \times 143 + 3 = 575$

1 323 sheets of colored paper will be divided equally among 3 classes. How many sheets of paper will each class get, and how many will be left over?

Math sentence $323 \div 3 = 107 \text{ R} 2$

Answer 107 R 2.
Each class will get 107 sheets and 2 are left over.

Check $3 \times 107 + 2 = 323$

2 There are 286 pencils divided into packages of 5 pencils each. How many packages we can make? How many pencils will be left over?

Math sentence $286 \div 5 = 57 \text{ R} 1$

Answer 57 R 1.
We can make 57 packages and 1 pencil will be left over.

Check $5 \times 57 + 1 = 286$

2 - 14 Division Algorithm-1

Calculations with Times as Much (1)

Example An adult whale is 15 m long, and its calf is 3 m long. How many times longer is the adult whale than its calf?

Math sentence $15 \div 3 = 5$

Answer 5 times

The adult whale is 5 times longer than its calf. Five times means that if we consider 3 m as 1, 15 m will be 5.

Answer the following questions.

1 My current weight is 36 kg. When I was a baby, my weight was only 4 kg. How many times heavier am I currently than when I was a baby?

Math sentence $36 \div 4 = 9$

Answer 9 times

2 I have 45 pencils. My younger brother has 9 pencils. How many times more pencils do I have than my brother?

Math sentence $45 \div 9 = 5$

Answer 5 times

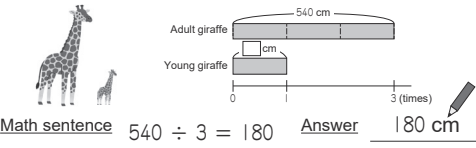
3 There are 90 pieces of white paper and 9 pieces of coloured paper. How many times more pieces of white paper are there than pieces of coloured paper?

Math sentence $90 \div 9 = 10$

Answer 10 times

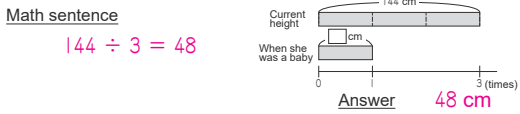
2 - 15 Division Algorithm-1
Calculations with Times as Much (2)

Example A adult giraffe is 540 cm tall. It is 3 times taller than the baby giraffe. How tall is the baby giraffe?

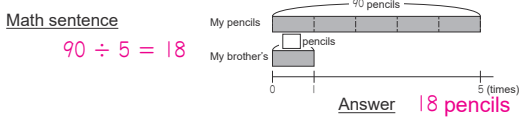


Answer the following questions.

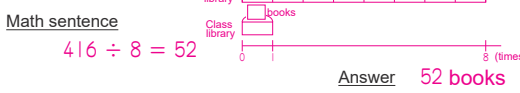
- 1 My sister is 144 cm tall. She is 3 times taller than when she was a baby. How tall was she when she was a baby?



- 2 I have 90 pencils. It is 5 times more pencils than what my brother has. How many pencils does my brother have?



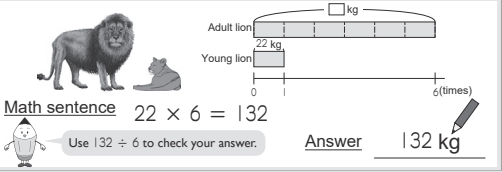
- 3 My school library has 416 books. My school library has 8 times more books than my class library. How many books does my class library have?



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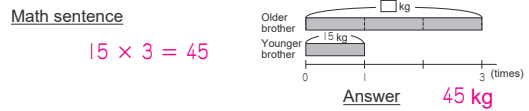
2 - 16 Division Algorithm-1
Calculations with Times as Much (3)

Example A young lion weighs 22 kg. An adult lion is 6 times heavier. How heavy is the adult lion?

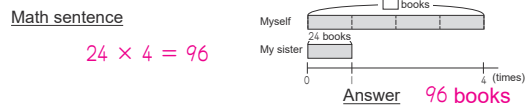


Answer the following questions.

- 1 My younger brother weighs 15 kg, and my older brother is 3 times heavier. How much does my older brother weigh?



- 2 My sister read 24 books last month. I read 4 times as many books as she did. How many books did I read in total last month?



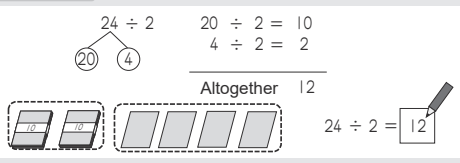
- 3 I cut a 35 cm long piece of ribbon. The ribbon was originally 8 times as long as the ribbon I have. How long was the original ribbon?



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2 - 17 Division Algorithm-1
Mental Calculation (1)

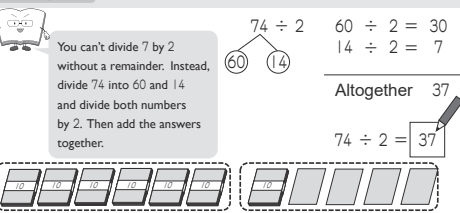
Example 1 Calculate $24 \div 2$



Calculate the following division problems in your head.

- 1 $48 \div 2 = 24$ 2 $63 \div 3 = 21$ 3 $48 \div 4 = 12$
4 $96 \div 3 = 32$ 5 $82 \div 2 = 41$ 6 $68 \div 2 = 34$

Example 2 Calculate $74 \div 2$



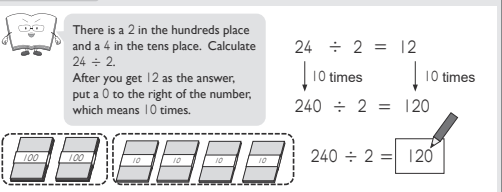
Calculate the following division problems in your head.

- 1 $76 \div 2 = 38$ 2 $45 \div 3 = 15$ 3 $95 \div 5 = 19$
4 $56 \div 4 = 14$ 5 $91 \div 7 = 13$ 6 $81 \div 3 = 27$

30

2 - 18 Division Algorithm-1
Mental Calculation (2)

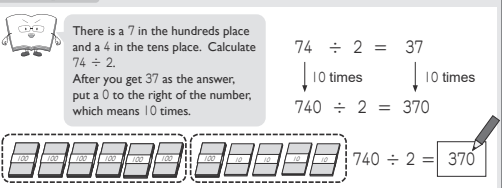
Example 1 Calculate $240 \div 2$



Calculate the following division problems in your head.

- 1 $640 \div 2 = 320$ 2 $550 \div 5 = 110$ 3 $690 \div 3 = 230$
4 $840 \div 4 = 210$ 5 $860 \div 2 = 430$ 6 $480 \div 4 = 120$

Example 2 Calculate $740 \div 2$



Calculate the following division problems in your head.

- 1 $760 \div 2 = 380$ 2 $540 \div 3 = 180$ 3 $960 \div 4 = 240$
4 $650 \div 5 = 130$ 5 $580 \div 2 = 290$ 6 $480 \div 3 = 160$
7 $680 \div 4 = 170$ 8 $650 \div 5 = 130$ 9 $780 \div 6 = 130$

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2 - 19 Division Algorithm-1 Review

1 Calculate the following division problems in your head.

① $90 \div 3 = 30$ ② $360 \div 4 = 90$ ③ $250 \div 5 = 50$
 ④ $1600 \div 4 = 400$ ⑤ $1000 \div 2 = 500$ ⑥ $2800 \div 7 = 400$
 ⑦ $24 \div 2 = 12$ ⑧ $69 \div 3 = 23$ ⑨ $88 \div 4 = 22$
 ⑩ $78 \div 6 = 13$ ⑪ $84 \div 3 = 28$ ⑫ $75 \div 5 = 15$
 ⑬ $840 \div 3 = 280$ ⑭ $960 \div 8 = 120$ ⑮ $960 \div 6 = 160$

2 Calculate the following division problems by using the algorithm. Then check your answer.

① $70 \div 3 = 23 \text{ R } 1$ ② $66 \div 4 = 16 \text{ R } 2$ ③ $97 \div 9 = 10 \text{ R } 7$

$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 3 \overline{) 70} \\ \underline{6} \\ 10 \\ \underline{9} \\ 1 \end{array}$$

Check $3 \times 23 + 1 = 70$

$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 4 \overline{) 66} \\ \underline{4} \\ 26 \\ \underline{24} \\ 2 \end{array}$$

Check $4 \times 16 + 2 = 66$

$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 9 \overline{) 97} \\ \underline{9} \\ 7 \end{array}$$

Check $9 \times 10 + 7 = 97$

④ $814 \div 4 = 203 \text{ R } 2$ ⑤ $925 \div 3 = 308 \text{ R } 1$ ⑥ $603 \div 5 = 120 \text{ R } 3$

$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 4 \overline{) 814} \\ \underline{8} \\ 14 \\ \underline{12} \\ 2 \end{array}$$

Check $4 \times 203 + 2 = 814$

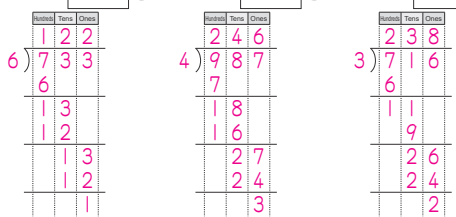
$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 3 \overline{) 925} \\ \underline{9} \\ 25 \\ \underline{24} \\ 1 \end{array}$$

Check $3 \times 308 + 1 = 925$

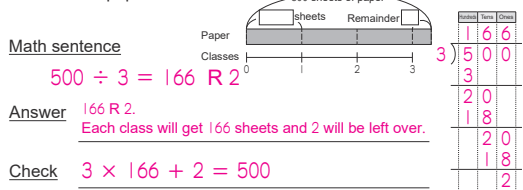
$$\begin{array}{r} \text{Hundred} \quad \text{Tens} \quad \text{Ones} \\ 5 \overline{) 603} \\ \underline{5} \\ 103 \\ \underline{100} \\ 3 \end{array}$$

Check $5 \times 120 + 3 = 603$

⑦ $733 \div 6 = 122 \text{ R } 1$ ⑧ $987 \div 4 = 246 \text{ R } 3$ ⑨ $716 \div 3 = 238 \text{ R } 2$



3 500 sheets of paper are divided equally among 3 classes. How many sheets of paper will each class get? How many sheets of paper will be left over?



4 I have 40 biscuits and my younger brother has 8 biscuits. How many times more biscuits do I have?

Math sentence $40 \div 8 = 5$

Answer 5 times

5 I have 72 pencils. I have 6 times more pencils than my brother has. How many pencils does my brother have?

Math sentence $72 \div 6 = 12$

Answer 12 pencils

3 - 1 Line Graphs How to Read Line Graphs

Instruction Let's compare the following graphs.

(people) Favorite colour

(°C) Temperature change

Both are bar graphs, and it looks similar... Look at the horizontal scale. The graph on the right shows the time series. To show time-series changes, we can use another representation, a line graph.

Instruction Let's find how much the temperature changes in a day.

Time	6 a.m.	9 a.m.	12 p.m.	3 p.m.	6 p.m.
Temperature (°C)	17	21	23	23	21

Temperature changes in a day

Temperature changes in a day

It is necessary to see changes using a line graph.

- Graphs like the one on the right is called a line graph.
- The slope of the line shows how quantities change.

Increase

No change

Decrease

Example The graph below shows ground temperature every two hours.

Temperature changes in a day

① What was the ground temperature at 12 p.m.? 18°C

② At what time was the temperature 21°C ? $2:00 \text{ p.m.}$

③ What was the lowest temperature and when was it?
Temperature: 6°C Time point: $6:00 \text{ a.m.}$

④ Between which two time points did the temperature rise?
From $6:00 \text{ a.m.}$ to $2:00 \text{ p.m.}$

⑤ Between which two time points did the temperature decline?
From $2:00 \text{ p.m.}$ to $6:00 \text{ p.m.}$

1 The graph below shows ground temperature every two hours.

Temperature changes in a day

① What was the grand temperature at 6 a.m.? 7°C

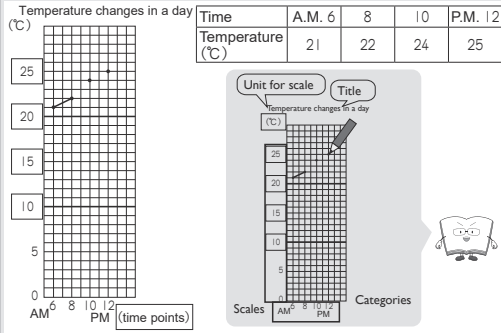
② At what time was the temperature 18°C ? $12:00 \text{ p.m.}$

③ What was the lowest temperature and when was it?
Temperature: 7°C Time point: $6:00 \text{ a.m.}$

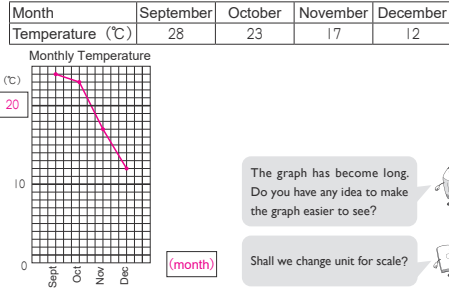
④ Between which two time points did the temperature rise?
From $6:00 \text{ a.m.}$ to $12:00 \text{ p.m.}$

3 - 2 Line Graphs **How to Draw Line Graphs (1)**

Example 1 The graph below shows ground temperature every two hours. Draw the line graph.

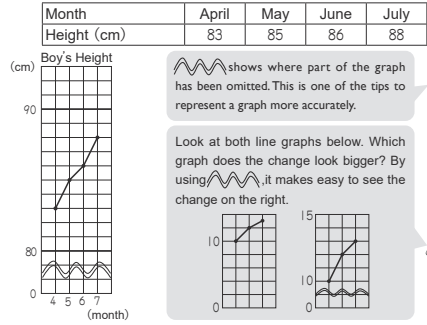


1 The graph below shows monthly temperatures for four months. Draw the two kinds of line graphs with different scales.

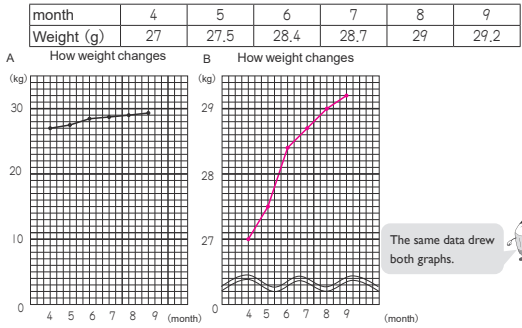


36

Example 2 The table below shows the record of a baby boy's height from April to July. Draw a line graph using the information in the table.



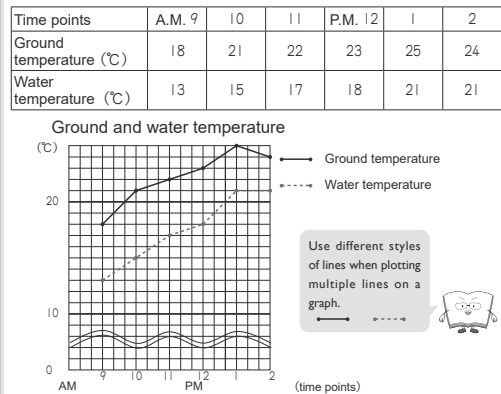
2 The following table shows how a boy's weight changed. Based on this, the graph became as shown in A. Rewrite the graph on grid paper B.



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3 - 3 Line Graphs **How to Draw Line Graphs (2)**

Example An aquaculture fisher is considering feeding. The table below shows ground temperature and water temperature. Draw the line graphs using the information and answer the following questions.



1 When is the biggest difference between the ground temperature and the water temperature? How many °C is the difference?

Time points: 10:00 a.m. Difference: 6 °C

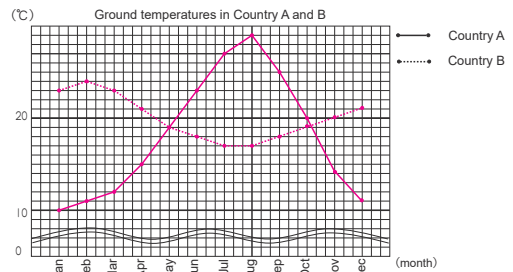
2 When is the smallest difference between the ground temperature and the water temperature? How many °C is the difference?

Time points: 2:00 p.m. Difference: 3 °C

38

A man lives in country A and considering vacation to country B. The table below shows two countries' ground temperature each month. Draw the line graphs and answer the following questions.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature in country A (°C)	10	11	12	15	19	23	27	29	25	20	14	11
Temperature in country B (°C)	23	24	23	21	19	18	17	17	18	19	20	21



1 What are the highest temperatures in each country?

Country A: 29 °C Country B: 24 °C

2 What are the lowest temperatures in each country?

Country A: 10 °C Country B: 17 °C

3 When is the biggest difference between the ground temperature and the water temperature? How many °C is the difference?

Month: January Difference: 13 °C

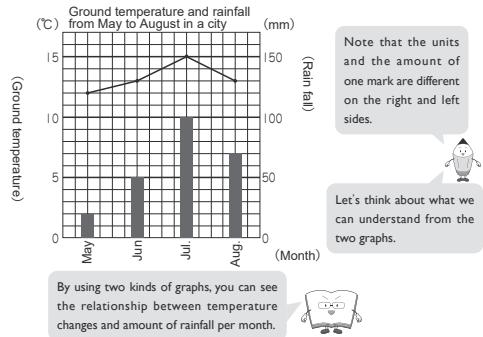
4 In which month are the temperatures in the two cities the same?

May

39

3 - 4 Line Graphs
Bar Graphs and Line Graphs

Example The graph below shows both the ground temperature in a line graph and the rain fall in a bar graph.



1 In which month did rainfall the most? How many mm did it rain?

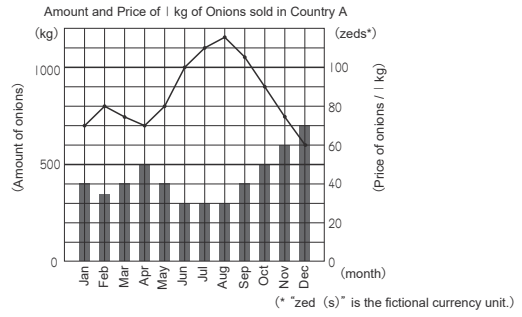
Month: Rainfall: mm

2 Choose appropriate observation on the graphs.

- A The amount of rainfall and temperature are decreased from May to August.
- B When the temperature is the highest, the amount of rainfall is the largest.
- C If the temperature raises, the rainfall increases.

40

The graph below shows both the amount of onion sold at a city market in a bar graph and the price of 1 kg of onions in a line graph.



1 Which month had the largest amount of onions? How much kg of onions were there?

Month: Amount: kg

2 Choose appropriate observation on the graphs.

- A From Jun to August, the price tends to be the lowest.
- B When the amount of onions goes up, the price goes down.
- C When the amount of onions is not changed, the price is decreased.

3 How much money was made by selling onions in June?

Math sentence

$$300 \times 100 = 30000$$

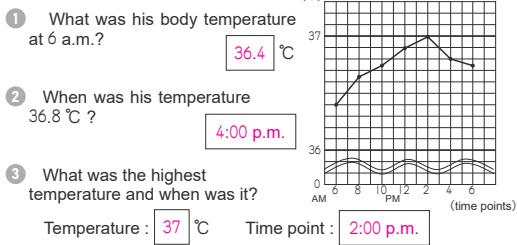
How many kg of onions were there and how much was price per kg?

Answer

41

3 - 5 Line Graphs
Review

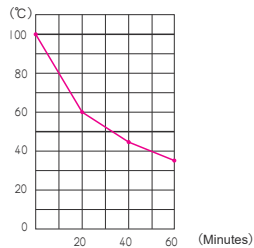
1 A boy recorded his body temperature to check his health on the graph below.



2 A manufacturer is developing a new mug. The table below shows the temperature change of coffee poured into an ordinal mug. Draw the line graphs using the information below.

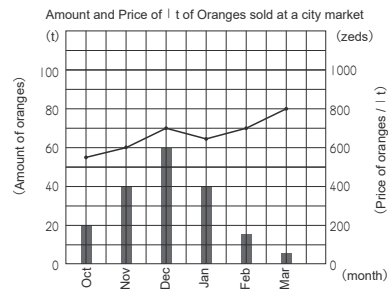
Time interval since pouring (minute)	0	20	40	60
Coffee temperature (°C)	100	60	45	35

Temperature change of coffee poured into a mug



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3 The graph below shows the amount of oranges sold at a city market in the bar graph and the price of 1 t of oranges in the line graph.



1 Which month had the largest amount of oranges? How much was it?

Month: Amount: t

2 Observe the graphs and write what you noticed.

- A When the amount of oranges increase, the price is reduced.
- B From January to March the amount of orange goes up and the price goes down.
- C Regardless of the amount of oranges, the price is increasing toward March.

3 How much money was made by selling oranges in March?

Math sentence

$$650 \times 40 = 26000$$

Answer

43

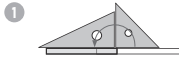
4 - 1 Angles Size of Angles and Angles of a Set Square

Example 1 Look at the angles below. How many right angles are there?

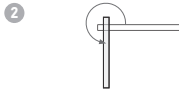


The angle has right angle.

1 Look at the angles below. How many right angles are there?



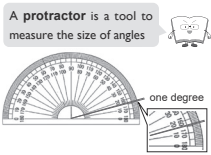
Angle **1** has right angles.



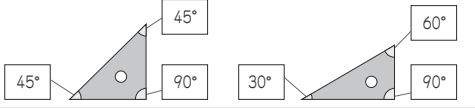
Angle **2** has right angles.

Instruction 1 Unit to express the size of angles.

- The size of an angle is determined by the amount of space between the sides and not the lengths of the sides.
- Degree** is a unit to express the size of angles. One angle revolution has 360 equal parts. The size of one part is one degree and is written as 1° .
- 1 right angle equals to 90° and 4 right angles equal to 360° .

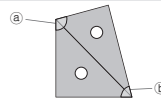


Instruction Measure the size of the angles on a set square using a protractor.

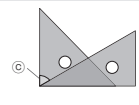


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Example Two different set squares are used to make angles as follows. Find the size of each marked angles.



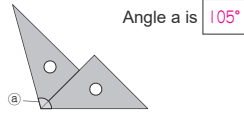
Angle a is



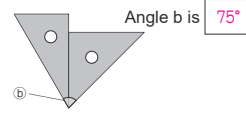
Angle b is

Angle c is

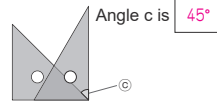
Two different set squares are used to make the following angles. Find the size of each marked angle.



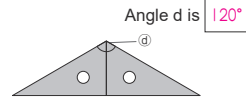
Angle a is



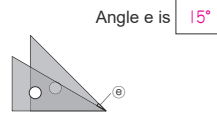
Angle b is



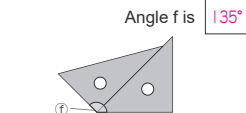
Angle c is



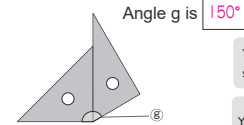
Angle d is



Angle e is



Angle f is



Angle g is

You can make various angles with set squares. Do you have any findings?

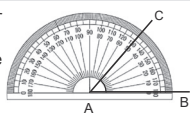
You can make $30^\circ, 45^\circ, 60^\circ, 75^\circ, 90^\circ, 105^\circ \dots$

45

4 - 2 Angles How to Measure Angles

Instruction How to use a protractor.

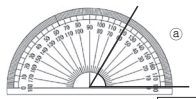
- Put the center of the protractor over vertex A of the angle.
- Put the 0° line over side AB of the angle.
- Read the scale mark that overlaps side AC.



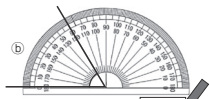
When line is too short to measure with a protractor, extend the line.



Example 1 Measure the following angles with a protractor.

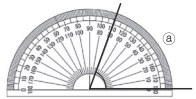


Angle a is

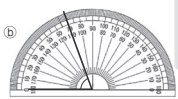


Angle b is

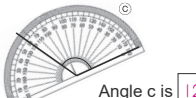
1 Measure the following angles with a protractor. *Wrong way to measure*



Angle a is



Angle b is



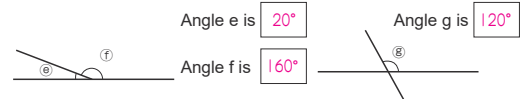
Angle c is



Angle d is

Put the 0° line over side of the angle.

46



Angle e is

Angle g is

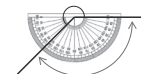
Angle f is

Example 2 Measure the following angles with a protractor.



Angle is

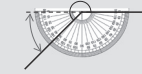
1. Measure the size of angle smaller it is than 180° .



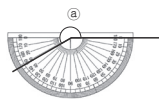
2. Subtract the angle from 360° .

$$360 - 135 = 225$$

Alternatively, you can measure by adding $180^\circ + 45^\circ = 225^\circ$



2 Measure the following angles with a protractor.



Angle a is

$$360 - 150 = 210$$



Angle b is

$$360 - 30 = 330$$

It is easier to find the angle by subtracting the small angle from 360° .

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4 - 3 Angles

How to Draw Angles

Instruction Let's draw a 50° angle using a protractor.

1. Draw a straight line between points A and B. Place the center of the protractor at point A and match side AB to the 0° line.
2. Draw a point C at the 50° scale mark.
3. Connect points A and C by drawing a straight line.

Example Draw the following angles using point A as the vertex.

- 1 70°
- 2 120°

Draw the following angles using point A as the vertex.

- 1 45°
- 2 20°
- 3 150°
- 4 135°

4 - 4 Angles

Review

1 Measure the following angles with a protractor.

Angle a is 45° Angle b is 65° Angle c is 90°
 Angle d is 10° Angle e is 110° Angle f is 240°

2 Two different set squares are used to make angles as follows. Find the size of each marked angle.

Angle a is 75° Angle a is 30°

3 Draw the following angles using point A as the vertex.

- 1 60°
- 2 157°
- 3 270°

We can measure an angle larger than 180° by subtracting the angle from 360°. Subtracting from 360°

5 - 1 Division Algorithm-2

Dividing by Multiples of 10 (1)

Example Calculate $60 \div 20$.

$6 \div 2 = 3$ Think of 10 as a single unit so that 60 equals 6 units of 10 and 20 equals 2 units of 10. If we do this, we can find the quotient for $60 \div 20$ by simply dividing 6 by 2.

$60 \div 20 = 3$

1 Calculate the following division problems in your head.

- 1 $60 \div 30 = 2$
- 2 $80 \div 20 = 4$
- 3 $90 \div 30 = 3$
- 4 $160 \div 40 = 4$
- 5 $240 \div 40 = 6$
- 6 $350 \div 50 = 7$
- 7 $300 \div 60 = 5$
- 8 $560 \div 80 = 7$
- 9 $630 \div 70 = 9$

Example 2 Calculate $90 \div 20$.

$9 \div 2 = 4 \text{ R } 1$ If we use 10 as a single unit, the problem will be $6 \div 2$ and the answer will be 4 R 1. Remember, since 1 is actually a unit of 10, the remainder will therefore be 10.

$90 \div 20 = 4 \text{ R } 10$

2 Calculate the following division problems in your head.

- 1 $70 \div 20 = 3 \text{ R } 10$
- 2 $80 \div 30 = 2 \text{ R } 20$
- 3 $130 \div 30 = 4 \text{ R } 10$
- 4 $150 \div 60 = 2 \text{ R } 30$
- 5 $350 \div 80 = 4 \text{ R } 30$
- 6 $600 \div 80 = 7 \text{ R } 40$

5 - 2 Division Algorithm-2

Dividing by Multiples of 10 (2)

Example There are 90 sheets of coloured paper. If 20 sheets are given equally to each child, how many children will get the coloured paper? How many sheets will be left over? Solve and check your work.

Math sentence $90 \div 20 = 4 \text{ R } 10$

Answer 4 children with 10 sheets left over.

Check $20 \times 4 + 10 = 90$

1 There are 70 pieces of candy. If every child gets 20 pieces, how many children will get candy? How many pieces of candy will be left over? Solve and check your work.

Math sentence $70 \div 20 = 3 \text{ R } 10$

Answer 3 R 10
3 children with 10 pieces of candy left over.

Check $20 \times 3 + 10 = 70$

2 A 500 cm ribbon is cut into 40 cm pieces. How many 40 cm pieces can we make? How many cm of ribbon will be left over? Solve and check your work.

Math sentence $500 \div 40 = 12 \text{ R } 20$

Answer 12 R 20
12 pieces of ribbon with 20 cm of ribbon left over.

Check $40 \times 12 + 20 = 500$

5 - 3 Division Algorithm-2
Division Algorithm (1)

Example Calculate $48 \div 12$.

Think of dividing 48 by 21. (Think of $40 \div 10$ and guess a quotient.)

Write the estimated quotient, 4, in the ones place.

Multiply 12 by 4. Write a 48.

Subtract 48 from 48. Write a 0 in the ones place.

$48 \div 12 = 4$

Check the answer: $12 \times 4 = 48$

Calculate the following division problems by using the algorithm.

1 $48 \div 24$ 2 $96 \div 32$ 3 $55 \div 11$ 4 $86 \div 43$

5 $66 \div 22$ 6 $48 \div 12$ 7 $68 \div 34$ 8 $69 \div 23$

9 $84 \div 21$ 10 $93 \div 31$ 11 $84 \div 21$ 12 $39 \div 13$

1	2	2	3	3	5	4	2
5	3	6	4	7	2	8	3
9	4	10	3	11	4	12	3

5 - 4 Division Algorithm-2
Division Algorithm (2)

Example Calculate $87 \div 21$.

Think of dividing 87 by 21. (Think of $80 \div 20$ and guess a quotient.)

Write the estimated quotient, 4, in the ones place.

Multiply 21 by 4. Write an 84.

Subtract 84 from 87. Write a 3 in the ones place. The remainder is 3.

$87 \div 21 = 4 \text{ R}3$

Check the answer: $21 \times 4 + 3 = 87$

Calculate the following division problems by using the algorithm.

1 $85 \div 21$ 2 $37 \div 12$ 3 $88 \div 43$ 4 $95 \div 31$

5 $68 \div 22$ 6 $67 \div 32$ 7 $46 \div 11$ 8 $67 \div 33$

9 $88 \div 42$ 10 $44 \div 13$ 11 $74 \div 34$ 12 $31 \div 28$

1	4 R 1	2	3 R 1	3	2 R 2	4	3 R 2
5	3 R 2	6	2 R 3	7	4 R 2	8	2 R 1
9	2 R 4	10	3 R 5	11	2 R 6	12	1 R 3

5 - 5 Division Algorithm-2
Division Algorithm (3)

Example Calculate $94 \div 32$.

Think of dividing 94 by 32. (Think of $90 \div 30$ and guess a quotient.) We can estimate 3 as the quotient.)

Write the estimated quotient, 3, in the ones place.

Multiply 32 by 3. Write a 96.

Subtract 96 from 94. The remainder is 30.

Write a 2.

Multiply 32 by 2. Write a 64.

Subtract 64 from 94. The remainder is 30.

$94 \div 32 = 2 \text{ R}30$

Check the answer: $32 \times 2 + 30 = 94$

Calculate the following division problems by using the algorithm.

1 $91 \div 31$ 2 $83 \div 21$ 3 $58 \div 12$ 4 $62 \div 22$

5 $96 \div 33$ 6 $67 \div 23$ 7 $78 \div 43$ 8 $48 \div 32$

9 $85 \div 34$ 10 $79 \div 22$ 11 $51 \div 13$ 12 $62 \div 24$

1	2 R 29	2	3 R 20	3	4 R 10	4	2 R 19
5	2 R 30	6	2 R 21	7	1 R 35	8	1 R 16
9	2 R 17	10	3 R 13	11	3 R 12	12	2 R 14

5 - 6 Division Algorithm-2
Division Algorithm (4)

Example Calculate $87 \div 17$.

Think of dividing 87 by 17. (Think of $80 \div 20$ and guess a quotient.) We can estimate 4 as the quotient.)

Write the estimated quotient, 4, in the ones place.

Multiply 17 by 4. Write an 68.

Subtract 68 from 87. Write a 19.

Write a 5.

Multiply 17 by 5. Write an 85.

Subtract 85 from 87. The remainder is 2.

$87 \div 17 = 5 \text{ R}2$

Check the answer: $17 \times 5 + 2 = 87$

Calculate the following division problems by using the algorithm.

1 $83 \div 27$ 2 $58 \div 19$ 3 $87 \div 28$ 4 $91 \div 18$

5 $79 \div 26$ 6 $60 \div 17$ 7 $56 \div 27$ 8 $41 \div 19$

9 $95 \div 29$ 10 $85 \div 38$ 11 $77 \div 25$ 12 $67 \div 16$

1	3 R 2	2	3 R 1	3	3 R 3	4	5 R 1
5	3 R 1	6	3 R 9	7	2 R 2	8	2 R 3
9	3 R 8	10	2 R 9	11	3 R 2	12	4 R 3

5 - 7 Division Algorithm-2

Division Algorithm (5)

Example Calculate $172 \div 21$.

Divide 17 by 21. Write a 0 in the tens place. (There is no problem if you do not write this 0.)

Write the estimated quotient, 8, in the ones place.

Multiply 21 by 0. Write 0.

Multiply 21 by 8. Write a 168.

Subtract 0 from 17. Write a 17.

Subtract 168 from 172. Write a 4. The remainder is 4.

Bring down the 2 in the ones place.

Check the answer: $21 \times 8 + 4 = 172$

Calculate the following division problems by using the algorithm.

1 $158 \div 22$	2 $169 \div 32$	3 $315 \div 43$	4 $336 \div 51$
-----------------	-----------------	-----------------	-----------------

$2 \overline{)158}$	$3 \overline{)169}$	$4 \overline{)315}$	$5 \overline{)336}$
---------------------	---------------------	---------------------	---------------------

5 $584 \div 62$	6 $300 \div 74$	7 $271 \div 53$	8 $266 \div 86$
9 $707 \div 98$	10 $300 \div 48$	11 $344 \div 67$	12 $643 \div 76$

1	7 R 4	2	5 R 9	3	7 R 14	4	6 R 30
5	9 R 26	6	4 R 4	7	5 R 6	8	3 R 8
9	7 R 21	10	6 R 12	11	5 R 9	12	8 R 35

5 - 8 Division Algorithm-2

Division Algorithm (6)

Example Calculate $345 \div 21$.

Think of dividing 34 by 21 (Think of $30 \div 20$ and guess a quotient).

Write the estimated quotient, 1, in the tens place.

Multiply 21 by 1. Write a 21.

Subtract 21 from 34. Write a 13.

Bring down 5 from the ones place.

Divide 135 by 21.

Write the estimated quotient 6 in the ones place.

Multiply 21 by 6. Write a 126.

Subtract 126 from 135. Write a 9 in the ones place.

The remainder is 9.

Check the answer: $21 \times 16 + 9 = 345$

Calculate the following division problems by using the algorithm.

1 $385 \div 12$	2 $897 \div 42$	3 $639 \div 14$	4 $431 \div 35$
-----------------	-----------------	-----------------	-----------------

$12 \overline{)385}$	$42 \overline{)897}$	$14 \overline{)639}$	$35 \overline{)431}$
----------------------	----------------------	----------------------	----------------------

5 $526 \div 25$	6 $761 \div 34$	7 $277 \div 18$	8 $352 \div 28$
9 $499 \div 23$	10 $989 \div 31$		

1	32 R 1	2	21 R 15	3	45 R 9	4	12 R 11	5	21 R 1	6	22 R 13
7	15 R 7	8	12 R 16	9	21 R 16	10	31 R 8				

5 - 9 Division Algorithm-2

Division Algorithm (7)

Example Calculate $6522 \div 27$.

Think of dividing 65 by 27 (Think of $60 \div 30$ and guess a quotient. We can estimate 2).

Write the estimated quotient, 2, in the hundreds place.

Multiply 27 by 2. Write a 54.

Subtract 54 from 65. Write an 11.

Bring down 2 from the tens place.

Divide 112 by 27.

Write the estimated quotient, 4, in the tens place.

Multiply 27 by 4. Write a 108.

Subtract 108 from 112. Write a 4.

Bring down 2 from the ones place.

Divide 42 by 27.

Write the estimated quotient, 1, in the ones place.

Multiply 27 by 1. Write a 27.

Subtract 27 from 42. Write a 15.

The remainder is 15.

Check the answer: $27 \times 241 + 15 = 6522$

Calculate the following division problems by using the algorithm.

1 $7969 \div 23$	2 $9245 \div 38$	3 $7674 \div 42$	4 $8773 \div 54$
------------------	------------------	------------------	------------------

$23 \overline{)7969}$	$38 \overline{)9245}$	$42 \overline{)7674}$	$54 \overline{)8773}$
-----------------------	-----------------------	-----------------------	-----------------------

5 $8095 \div 63$	6 $7994 \div 71$	7 $8961 \div 52$	8 $9738 \div 31$
9 $9741 \div 45$	10 $6869 \div 18$		

1	182 R 30	2	162 R 25	3	128 R 31	4	112 R 42
5	172 R 17	6	314 R 4	7	216 R 21	8	381 R 11

5 - 10 Division Algorithm-2

Division Algorithm (8)

Example Calculate $3016 \div 28$.

Think of dividing 30 by 28 (Think of 28 as 30 and $30 \div 30$. Then guess a quotient).

Write the estimated quotient, 1, in the hundreds place.

Multiply 28 by 1. Write a 28.

Subtract 28 from 30. Write a 2.

Bring down 1 from the tens place.

Divide 21 by 28 ($21 \div 28 = 0$ R 21).

Write the quotient, 0, in the tens place.

Multiply 28 by 0. Write a 0.

Subtract 0 from 21. Write 21.

Bring down 6 from the ones place.

Divide 216 by 28.

Write the estimated quotient, 7, in the ones place.

Multiply 28 by 7. Write a 196.

Subtract 196 from 216. The remainder is 15.

Check the answer: $28 \times 107 + 15 = 3016$

Calculate the following division problems by using the algorithm.

1 $5679 \div 52$	2 $3954 \div 19$	3 $7021 \div 23$	4 $4458 \div 41$
------------------	------------------	------------------	------------------

$52 \overline{)5679}$	$19 \overline{)3954}$	$23 \overline{)7021}$	$41 \overline{)4458}$
-----------------------	-----------------------	-----------------------	-----------------------

5 $7896 \div 13$	6 $9231 \div 23$	7 $5773 \div 54$	8 $8354 \div 27$
9 $4871 \div 47$	10 $7053 \div 34$		

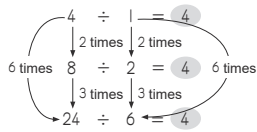
1	109 R 11	2	208 R 2	3	305 R 6	4	108 R 30	5	607 R 5	6	401 R 8
7	106 R 49	8	309 R 11	9	103 R 30	10	207 R 15				

5 - 11

Division Algorithm-2

Properties of Division

Instruction The quotient does not change if you divide the dividend and the divisor by the same number.



So, the division math sentence can be remade to the simpler sentence. For example, $24 \div 6$ becomes $8 \div 2$.



Example There are 150 sheets of coloured paper. If we give 50 sheets to each person, how many people will get coloured paper?

Think about bundles of 10 sheets of paper.
 150 sheets \rightarrow 15 bundles of paper $150 \div 50 = 3$
 50 sheets \rightarrow 5 bundles of paper $15 \div 5 = 3$

Math sentence $150 \div 50 = 3$ **Answer** 3 people

There are 180 pencils. If we give 60 pencils to each child, how many children will get pencils?

1 Think of 10 pencils as 1 unit.

180 pencils \rightarrow 18 $18 \div 6 = 3$

60 pencils \rightarrow 6 **Math sentence** $180 \div 60 = 3$ **Answer** 3 children

2 Think of 6 pencils as 1 unit.

180 pencils \rightarrow 30 $30 \div 10 = 3$

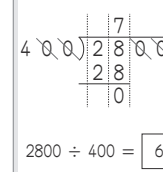
60 pencils \rightarrow 10 **Math sentence** $180 \div 60 = 3$ **Answer** 3 children

5 - 12

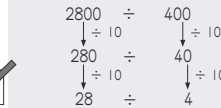
Division Algorithm-2

Simplifying Division Algorithm

Example 1 Think about how to calculate $2800 \div 400$.



Think of 100 as 1 unit.
 2800 becomes 28.
 400 becomes 4.

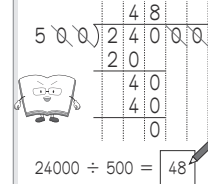


When the dividend and the divisor end with 0's, we can cross out the same number of 0's from dividend and divisor before calculating.

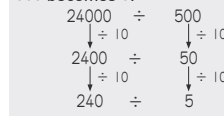
Think about how to calculate the following division problems.

- 1 $1600 \div 80 = 20$ 2 $2400 \div 600 = 4$ 3 $7200 \div 900 = 8$

Example 2 Think about how to calculate $24000 \div 500$.

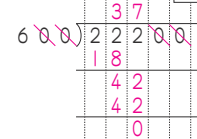
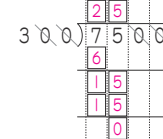


Think of 100 as 1 unit.
 24000 becomes 240.
 500 becomes 5.



Think about how to calculate the following division problems.

- 1 $7500 \div 300 = 25$ 2 $22200 \div 600 = 37$



5 - 13

Division Algorithm-2

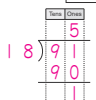
Review

1 Calculate the following by using the properties of division.

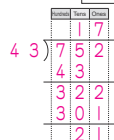
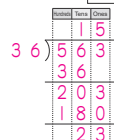
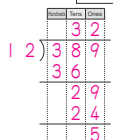
- 1 $320 \div 40 = 8$ 2 $420 \div 70 = 6$ 3 $320 \div 80 = 4$
 4 $1600 \div 800 = 2$ 5 $72000 \div 900 = 80$ 6 $3600 \div 60 = 60$

2 Calculate the following by using the division algorithm.

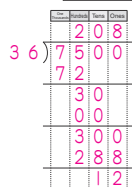
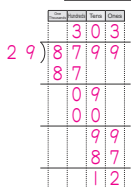
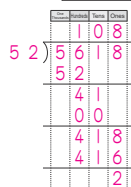
- 1 $91 \div 18 = 5 R 1$ 2 $359 \div 51 = 7 R 2$ 3 $459 \div 74 = 6 R 15$



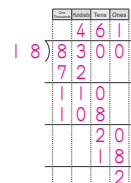
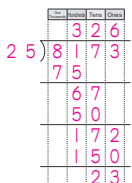
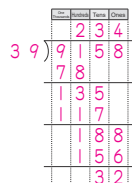
- 4 $389 \div 12 = 32 R 5$ 5 $563 \div 36 = 15 R 23$ 6 $752 \div 43 = 17 R 21$



- 7 $5618 \div 52 = 108 R 2$ 8 $8799 \div 29 = 303 R 12$ 9 $7500 \div 36 = 208 R 12$



- 10 $9158 \div 39 = 234 R 32$ 11 $8173 \div 25 = 326 R 23$ 12 $8300 \div 18 = 461 R 2$



3 600 sheets of paper are divided equally between 28 students. How many sheets of paper will each student get? How many sheets will be left over? Solve and check your work.

Math sentence

$600 \div 28 = 21 R 12$



Answer

21 R 12
 Each child can get 21 sheets and 12 will be left over.

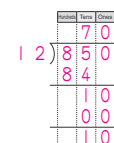
Check

$28 \times 21 + 12 = 600$

4 An 850 cm tape is cut into 12 cm pieces. How many 12 cm pieces are there? How long is the left over piece of tape? Solve and check your work.

Math sentence

$850 \div 12 = 70 R 10$



Answer

70 R 10
 We can make 70 pieces and 10 cm will be left over.

Check

$12 \times 70 + 10 = 850$

6 - 1 Rounding Numbers and Calculation

Expressing Approximate Numbers (1)

Instruction Round the following numbers to the nearest thousand.

1 5115 2 5761

5115 is close to 5000, so we say it is approximately 5000.
5761 is close to 6000, so we say it is approximately 6000.

"Approximate numbers" make a number more simple when knowing the exact number isn't important.

To know if the number is rounded up to 6000 or rounded down to 5000, evaluate the number in the hundreds place. If the number in the hundreds place is 4 or lower, round down.

Example A football game was held yesterday. The newspaper reported that there were 36853 people in the stadium to watch the game. Show this number on the number line and round it to the nearest thousand.

Look at the number in the hundreds place if we round up or down.

36853 is approximately 37000.

1 Show the following numbers on the number line and round it to the nearest thousand.

1 4896 → 5000 2 47335 → 47000

2 Round the following numbers to the nearest thousand by paying attention to the digits in the hundreds place.

1 1814 → 2000 2 92120 → 92000 3 47936 → 48000

6 - 2 Rounding Numbers and Calculation

Expressing Approximate Numbers (2)

Instruction Round the numbers 5115 and 5761 to the nearest thousand without using the number line.

When approximating a number between 5000 and 6000 to the nearest thousand, if the digit in the hundreds place is 0, 1, 2, 3, or 4, we round down and say it is approximately 5000. If it is 5, 6, 7, 8, or 9, we round up and say it is approximately 6000. This process is called **rounding**.

5115 → Pay attention to the digit in the hundreds place. It is 1. 5115 is rounded down to 5000.
5761 → Pay attention to the digit in the hundreds place. It is 7. 5761 is rounded up to 6000.

Example Round the following numbers to the nearest ten thousand by paying attention to the digits in the one thousands place.

1 58213 → 60000 2 274865 → 270000

1 Round the following numbers to the nearest ten thousand.

1 36845 → 40000 2 51382 → 50000
3 128056 → 130000 4 306392 → 310000
5 7954302 → 7950000 6 8217920 → 8220000

2 Round the following numbers to the nearest hundred thousand.

1 682038 → 700000 2 338902 → 300000
3 4519736 → 4500000 4 2153219 → 2200000
5 35076493 → 35100000 6 62437548 → 62400000

6 - 3 Rounding Numbers and Calculation

Expressing Approximate Numbers (3)

Instruction Round a number of 392356 to its highest place.

From the highest place.

In order to round to the highest place, we round the digit in the second highest place.
In this case, we round up to 400000, because the number in the second highest place is 9.

Example Round 28136 to the highest place.
Round 28136 to the second highest place.

1 28136 → The number rounded to the highest place. 30000
→ The number rounded to the second highest place. 28000

1 Round the following numbers to the highest place.

1 3899 → 4000 2 5379 → 5000
3 82659 → 80000 4 68029 → 70000
5 639203 → 600000 6 258293 → 300000

2 Round the following numbers to the second highest place.

1 62987 → 63000 2 78301 → 78000
3 454390 → 450000 4 626929 → 630000
5 1469020 → 1500000 6 2090800 → 2100000

6 - 4 Rounding Numbers and Calculation

Range of Rounded Numbers

Instruction Think about the range of the original number that has been rounded to 130.

Rounded to 120 Rounded to 130 Rounded to 140

The range in which the number will be rounded to 130 when it is rounded to the nearest ten is said to be, "greater than or equal to 125, and less than 135."

Greater than or equal to 125 Equal to 125 or larger
Less than 135 Smaller than 135
Less than or equal to 135 Equal to 135 or smaller

Example What are the largest and smallest numbers that can be rounded to 800 when rounded to the nearest hundred?

Smallest number 750 Largest number 849

When looking at the tens number, any number between 750 and 849 will round to 800.

1 What are the largest and smallest numbers that can be rounded to the following numbers when rounded to the nearest ten.

	Smallest	Largest		Smallest	Largest		
1	60	55	64	2	30	25	34
3	120	115	124	4	380	375	384

2 What are the largest and smallest numbers that can be rounded to the following numbers when rounded to the nearest hundred.

	Smallest	Largest		Smallest	Largest		
1	400	350	449	2	700	650	749
3	2600	2550	2649	4	4800	4750	4849

6 - 5 Rounding Numbers and Calculation
Calculation with Approximate Numbers (1)

Example I own a restaurant. 197 guests came to my restaurant on Sunday, 173 guests came yesterday, and 128 guests came today. Approximately how many total guests came to my restaurant over these days? Estimate the number of guests to the nearest hundred.

$$197 + 173 + 128 = 498$$

Round each number first and then add.

$$200 + 200 + 100 = 500$$

Math sentence $200 + 200 + 100 = 500$ Answer 500 guests

1 There is a famous park in my town. 322 tourists came to the park in April, 172 tourists came in May, and 207 tourists came in June. Approximately how many tourists came to the park during these three months? Estimate the number of tourists to the nearest hundred.

Math sentence $300 + 200 + 200 = 700$ Answer 700 tourists

2 The table below shows the number of people that came to a football stadium on Saturday, Sunday and Monday.

Day of the week	Saturday	Sunday	Monday
Number of people	15340	23537	8752

1 Approximately how many people came to the stadium these three days? Estimate the number of people to the nearest thousand.

Math sentence $15000 + 24000 + 9000 = 48000$ Answer 48000 people

2 What is the difference between the number of people that came on Saturday and the number of people that came on Monday? Round to the nearest thousand.

Math sentence $15000 - 9000 = 6000$ Answer 6000 people

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6 - 6 Rounding Numbers and Calculation
Calculation with Approximate Numbers (2)

Example The distance from my house to school is 1890 m round trip. If I go to school 209 days this year, what is the approximate distance I will walk this year? Estimate the total distance by using rounded numbers to the highest place.

$$1890 \times 209 = 395010$$

Round each number first and then multiply.

$$2000 \times 200 = 400000$$

Math sentence $2000 \times 200 = 400000$ Answer 400000 m

1 The distance from my house to the market is 725 m round trip. My mother walks to this market 295 days a year. What is the approximate travel distance that my mother walks in a year? Estimate the total distance by using rounded numbers to the highest place.

Math sentence $700 \times 300 = 210000$ Answer 210000 m

2 My father delivers newspapers to 289 houses in our neighborhood 317 days a year. Approximately how many newspapers does he deliver in one year? Estimate the answer by using rounded numbers to the nearest hundred.

Math sentence $300 \times 300 = 90000$ Answer 90000 newspapers

3 In one day, a company sold 615 packages of sweet. Approximately how many packages of sweet will this company sell in half year (182 days)? Estimate the answer by using rounded numbers to the nearest hundred.

Math sentence $600 \times 200 = 120000$ Answer 120000 packages

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6 - 7 Rounding Numbers and Calculation
Calculation with Approximate Numbers (3)

Example A bakery sold 15820 loafs of bread in one year (365 days). Approximately how many loafs of bread did this bakery sell in one day? Estimate the answer by using rounded numbers to the nearest thousand for the dividend and to the nearest hundred for the divisor.

$$15820 \div 365 = 43 \text{ R}125$$

Round each number first and then divide.

$$16000 \div 400 = 40$$

Math sentence $16000 \div 400 = 40$ Answer 40 loafs

1 An automobile company sold 23708 cars last year (365 days). Approximately how many cars did the company sell in one day? Estimate the answer by using rounded numbers to the nearest thousand for the dividend and to the nearest hundred for the divisor.

Math sentence $24000 \div 400 = 60$ Answer 60 cars

2 The perimeter of the lake at the park is 790 m. The distance you run during a marathon is 42195 m. How many times would you have to run around the perimeter of the lake to run as far as a marathon? Estimate the answer by using rounded numbers to the nearest ten thousand for the dividend and to the nearest hundred for the divisor.

Math sentence $40000 \div 800 = 50$ Answer 50 times




3 There are 213 boxes. The total weight is 27940 kg. Approximately how much does one box weigh? Estimate the answer by using rounded numbers to the nearest thousand for the dividend and to the nearest hundred for the divisor.

Math sentence $28000 \div 200 = 140$ Answer 140 kg

70

6 - 8 Rounding Numbers and Calculation
Calculation with Approximate Numbers (4)

Example 1 A girl shopping at a stationary shop is wondering if 500 zeds* is enough to buy all of the following items. **Round up** the price of each item and estimate the total cost to know if she can buy all three items with 500 zeds. (*"zed(s)" is the fictional currency unit.)

 Colour pencil 184 zeds	 Stapler 179 zeds	 Notebook 113 zeds	To judge whether the total cost is less than a certain amount, you can round up each price and then add them together. In this case, round the numbers to the nearest ten. The total is about 490 zeds and she can buy all items.
Math sentence $190 + 180 + 120 = 490$ Answer <u>Yes</u>			

1 Another girl is wondering if 600 zeds* is enough to buy a ballpoint pen (135 zeds), scissors (222 zeds) and a diary (219 zeds). **Round up** the cost each item and estimate the total cost if she can buy all three items with 600 zeds. (*"zed(s)" is the fictional currency unit.)

Math sentence $140 + 230 + 220 = 590$ Answer The total is about 590 zeds and she can buy all items.

Example 2 At this stationary shop, we can draw one lot for purchases of 500 zeds* or more. A boy wants to purchase a marker (126 zeds), a ruler (179 zeds) and a pencil case (221 zeds). He is wondering whether the total is 500 zeds or more. **Round down** the price of each item and estimate the total cost if he can draw one lot. (*"zed(s)" is the fictional currency unit.)

Math sentence $120 + 170 + 220 = 510$
Answer The total is more than 500 zeds and he can draw one lot.

To judge whether the total cost is more than a certain amount, you can **round down** each price and then add them together. In this case, round the numbers to the nearest ten.

2 At this store, we can get a small gift for purchases of 600 zeds* or more. I would like to buy a pencil set (102 zeds), a set of paperclips (154 zeds) and a pencil sharpener (378 zeds). Can I get a small gift? Round down the cost each item and estimate the total cost. (*"zed(s)" is the fictional currency unit.)

Math sentence $100 + 150 + 370 = 620$ Answer The total is more than 600 zeds and I can get a small gift.

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6 - 9

Rounding Numbers and Calculation

Review

1 Which of the following numbers can be expressed as approximate numbers? Explain your reasoning.

- 1 The distance between your home and the station
- 2 Your temperature when you are sick
- 3 The number of people attending a school festival
- 4 Your height in cm

Answer: 1 and 3
Your reason: These numbers do not need to be expressed as exact numbers.

2 In which place do we need to round 3472856 in each of the following cases? Then answer the rounded numbers.

- 1 To find out about how many ten-thousands there are.
- 2 To approximate to the nearest thousand.
- 3 To approximate to the highest place.

1	One thousands	place	3470000
2	Hundreds	place	3473000
3	One millions	place	3000000

3 Round the following numbers to the nearest ten thousand.

- 1 10942 → 10000 2 437296 → 440000 3 2985871 → 2990000

4 Choose the numbers that become 50000 when you round them to the nearest thousand.

- 1 50263 2 40732 3 50941 4 49504 **1 and 4**

5 What are the smallest and largest numbers that can be rounded to the following numbers when rounded to the nearest ten.

	Smallest	Largest		Smallest	Largest	
1	30	25	34	70	65	74
3	250	245	254	870	865	874

6 Estimate the answers to the following problems by rounding the numbers to the nearest hundred.

- 1 $338 + 267 + 1824 = 300 + 300 + 1800 = 2400$
- 2 $495 + 213 + 287 = 500 + 200 + 300 = 1000$
- 3 $385 + 1183 + 2131 = 400 + 1200 + 2100 = 3700$
- 4 $1000 - 176 - 325 = 1000 - 200 - 300 = 500$
- 5 $1000 - 419 - 298 = 1000 - 400 - 300 = 300$
- 6 $1000 - 526 - 396 = 1000 - 500 - 400 = 100$

7 Estimate the answers to the following problems by rounding the numbers to the highest place.

- 1 $847 \times 5649 = 800 \times 6000 = 4800000$
- 2 $7298 \times 284 = 7000 \times 300 = 2100000$
- 3 $1965 \times 412 = 2000 \times 400 = 800000$
- 4 $76354 \div 38 = 80000 \div 40 = 2000$
- 5 $626481 \div 190 = 600000 \div 200 = 3000$
- 6 $892785 \div 315 = 900000 \div 300 = 3000$

8 My friend is wondering if 1000 zeds* is enough to buy a tooth paste (246 zeds), a washing detergent (375 zeds) and a shampoo (418 zeds). Round up the cost each item and estimate the total cost if she can buy all three items with 1000 zeds. (* "zed(s)" is the fictional currency unit.)

When calculating, round up the numbers to the nearest ten.

Math sentence

$$250 + 380 + 420 = 1050$$

Answer

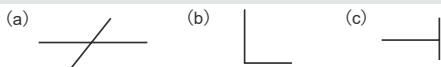
The total is about 1050 zeds and she cannot buy all items with 1000 zeds.

7 - 1

Perpendicular / Parallel Lines and Quadrilaterals

Intersecting Lines

Example Which of the following intersections have a right angle?



Intersection b and c have a right angle.

By matching a set square or a corner of folded paper, you can find it.

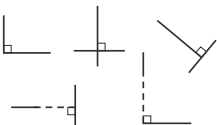
1 Which of the following intersections have a right angle?



Intersection a and d have a right angle.

Instruction Perpendicular lines.

- When two lines intersect at a right angle, they are called "perpendicular."
- Even when two lines are not intersecting if we can find a right angle by extending the lines, we can still call these lines are perpendicular.



2 Which of the lines shown in the figure below are perpendicular to Line A?



B, E, and G

7 - 2

Perpendicular / Parallel Lines and Quadrilaterals

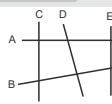
Arrangements of Lines

Instruction Parallel lines.

- When two lines are perpendicular to another line, these two lines are called "parallel."

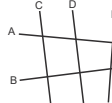


Example 1 Which pair of lines are parallel to each other?



C and E

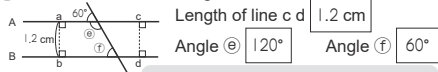
1 Which pair of lines are parallel to each other?



C and D

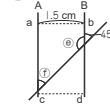
Example 2 Line A and B are parallel.

- Find the length of line c d.
- Find the size of the angles.



The length between two parallel lines is the same everywhere, which means parallel lines never intersect.

2 When Line A and B are parallel, 1 find the length of cd and 2 find the size of angles e, f.



Length cd 1.5 cm

Angle e 135° Angle f 45°

7 - 3 Perpendicular / Parallel Lines and Quadrilaterals
How to Draw Perpendicular / Parallel Lines

Instruction How to draw perpendicular line.

1. Match a side of a set square to the given line.	2. While holding the set square on the left, place the other set square so that the sides of the right angle matches the line.	3. Hold the set squares down and draw a line. The right angle matches the line.
--	--	---

Example 1 Draw a perpendicular line to line A through the given point a.

1 Draw a perpendicular line to each of the following lines through the given point.

Instruction How to draw parallel lines.

1. Line up one of the right angle sides of a set square on the line.
2. As you hold the set square on the right steady, put another set square along the other side of the right angle.
3. Slide the set square down on the right and draw another line.

Check if the two lines intersect each other or not.

Example 2 Draw a line parallel to the given line that passes through point a.

2 Draw a line parallel to the given line that passes through the following points.

3 Draw lines parallel to line A. The length between all the lines should be 1 cm.

7 - 4 Perpendicular / Parallel Lines and Quadrilaterals
Various Quadrilaterals (1)

Instruction Make various quadrilaterals by overlapping the following figures as follows.

Example 1 Find the trapezoids amongst the following quadrilaterals.

1 Find trapezoids amongst the following quadrilaterals.

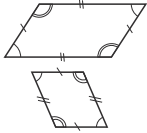
Example 2 Draw the following trapezoid.

2 Draw the following trapezoids.

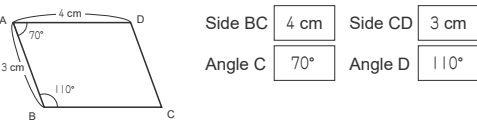
7 - 5 Perpendicular / Parallel Lines and Quadrilaterals
Various Quadrilaterals (2)

Instruction Parallelograms.

- A quadrilateral with two pairs of parallel lines is called a **parallelogram**.
- The lengths of the opposite sides are equal.
- The sizes of the facing corners are equal.

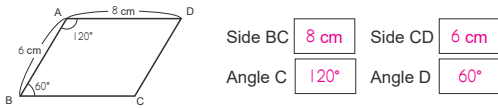


Example 1 Find the following lengths and angles.
Sides BC and CD, Angle C and D

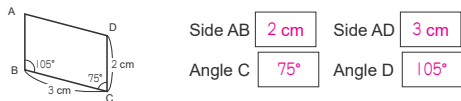


1 Find the following lengths and angles.

1 Sides BC and CD, Angle C and D



2



Example 2 Lines A and B are parallel. Draw a parallelogram using these lines.

1. Draw a straight line using a set square.	2. Slide the set square up and down. Draw another line.	3. This is your parallelogram.

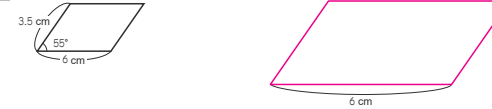
2 Lines A and B are parallel. Draw a parallelogram using these lines.



Example 3 Draw the following parallelogram.

1. Draw the line with 50° and 5 cm length.	2. Draw the line with 5.5 cm parallel to the bottom line.	3. Draw the line to make the parallelogram.

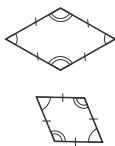
3 Draw the following parallelogram.



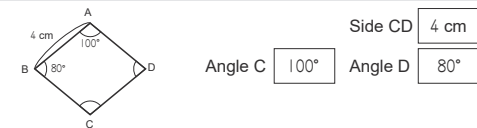
7 - 6 Perpendicular / Parallel Lines and Quadrilaterals
Various Quadrilaterals (3)

Instruction What is a rhombus.

- A **rhombus** is a quadrilateral whose four sides are equal in length.
- The opposite sides of a rhombus are parallel.
- The opposite angles of a rhombus are equal.

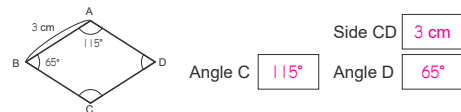


Example 1 Find the following lengths and angles.
Sides BC, Angle C and D



1 Find the following lengths and angles.

1 Sides BC and CD, Angle C and D



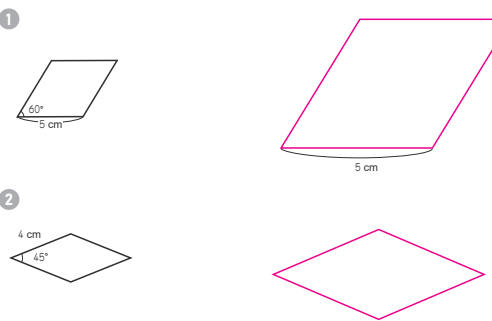
2



Example 2 Draw the following rhombus.

1. Draw the line with 50° and 5 cm length.	2. Draw the line with 5.5 cm parallel to the bottom line.	3. Draw the line to make the parallelogram.

2 Draw the following rhombuses.



7 - 7

Perpendicular / Parallel Lines and Quadrilaterals

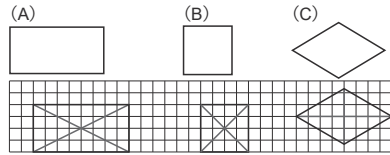
Diagonal Lines and Quadrilaterals

Instruction Diagonals.

- The straight lines that connect opposite vertices are called **diagonals**.
- There are two diagonals inside a quadrilateral.

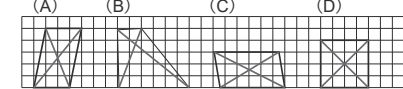


Example 1 Examine the figures below using a compass or a set square.



- Which ones have the same diagonal length? A, B
- Which ones have diagonals that are perpendicular? B, C
- Which ones intersect at the middle of each diagonal? A, B, C

1 Examine the following in the figures below using a compass or a set square.



- Which ones have the same diagonal length? D
- Which ones have the diagonals perpendicular? D
- Which ones intersect at the middle of each diagonal? A, C, D

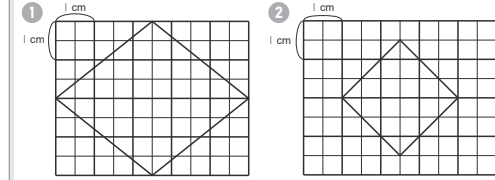
84

2 Summarize the characteristics of diagonals of quadrilaterals in the table below. Write a if the characteristics are true.

	Square	Rectangle	Rhombus	Parallelogram	Trapezoid
The lengths of diagonals are the same	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The diagonals are perpendicular	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each diagonal intersects at the middle of the line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

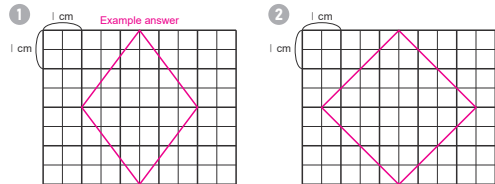
Example 2 Draw the following figures.

- A rhombus with 4 cm and 5 cm diagonals
- A square with 3 cm diagonals



3 Draw the following figures.

- A rhombus with 3 cm and 4 cm diagonals
- A square with 4 cm diagonals



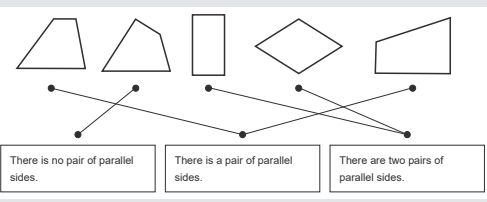
85

7 - 8

Perpendicular / Parallel Lines and Quadrilaterals

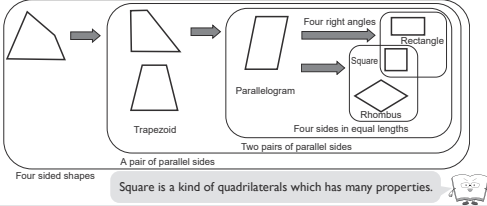
Classification of Quadrilaterals

Example Match the following quadrilaterals and its properties

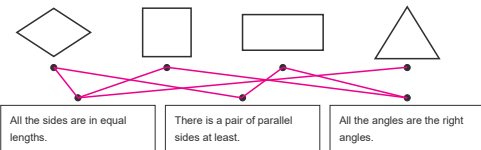


Instruction Classification of quadrilaterals.

Focusing on its sides or angles, quadrilaterals are classified as follows:



Match the following quadrilaterals and its properties



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7 - 9

Perpendicular / Parallel Lines and Quadrilaterals

Review

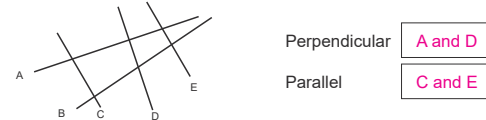
1 Which of the following intersections have a right angle?



Intersection a and b have a right angle.

2 Which of the lines shown in the figure below are the following?

- Pair of perpendicular lines
- Pair of parallel lines

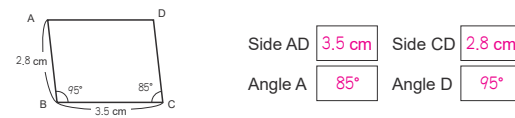


Perpendicular A and D

Parallel C and E

3 Find the following lengths and angles.

1 Parallelogram



Side AD 3.5 cm Side CD 2.8 cm

Angle A 85° Angle D 95°

2 Rhombus



Side CD 2.6 cm

Angle D 40° Angle A 140°

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8 - 1 Properties of Operations

Order of Operations (1)

Instruction A stationary shop had 50 pencils. Last month 10 pencils were sold, and 15 pencils were sold in this month. How many pencils does the shop have left? Make a single math sentence.

Two students thought as follows:

Student A

$$\begin{aligned} 50 - 10 &= 40 \\ 40 - 15 &= 25 \\ \text{Answer } &25 \text{ pencils} \end{aligned}$$

Student B

$$\begin{aligned} 10 + 15 &= 25 \\ 50 - 25 &= 25 \\ \text{Answer } &25 \text{ pencils} \end{aligned}$$

Any math equations inside () are calculated first.

Example A cake shop had 40 cakes. 20 cakes were sold in this morning and 15 cakes were sold in this afternoon. How many cakes does the shop have left?

Math sentence: $40 - (20 + 15) = 40 - 35 = 15$ Answer: 15 cakes

1 An electronics store had 20 TVs at a special price. Eight TVs were sold yesterday and 11 TVs were sold today. How many TVs does the store have left?

Math sentence: $20 - (8 + 11) = 20 - 19 = 1$ Answer: 1 TV

2 Calculate the following.

1 $70 - (30 + 25) = 15$ 2 $80 - (15 + 40) = 25$

3 $50 - (40 - 10) = 20$ 4 $60 - (86 - 55) = 29$

8 - 2 Properties of Operations

Order of Operations (2)

Instruction Cakes can be packed into a box 2 deep and 3 wide. How many boxes do you need to hold 60 cakes? Make a single math sentence.

Number of cakes \div Number of cakes that one box can hold = Number of boxes

$$60 \div (2 \times 3) = 10$$

When there are () in a math sentence, the part of () is calculated first.

Example Watermelons can be packed into a box 3 deep and 4 wide. How many boxes do we need to hold 48 watermelons? Make a single math sentence.

Math sentence: $48 \div (3 \times 4) = 48 \div 12 = 4$ Answer: 4 boxes

1 Oranges can be packed into a box 6 deep and 8 wide. How many boxes do you need to hold 480 oranges?

Math sentence: $480 \div (6 \times 8) = 480 \div 48 = 10$ Answer: 10 boxes

2 The seats on a train seat 2 people on one side of the aisle and 3 people on the other. How many rows of seats are needed to seat 25 people?

Math sentence: $25 \div (2 + 3) = 25 \div 5 = 5$ Answer: 5 rows

3 Calculate the following.

1 $420 \div (12 + 30) = 10$ 2 $560 \div (8 \times 7) = 10$

3 $(165 - 45) \div 8 = 15$ 4 $480 \div (95 - 55) = 12$

8 - 3 Properties of Operations

Order of Operations (3)

Example 1 I bought a pencil that costs 80 zeds* and 4 pieces of paper each of which costs 15 zeds*. What is the total price? (*zed(s)* is the fictional currency unit.)

The total price of pencils: 80 (zeds)
The total price of paper: $15 \times 4 = 60$ (zeds)

How to calculate " $80 + 15 \times 4$ ".

$$\begin{aligned} 80 + 15 \times 4 &= 80 + 60 \\ &= 140 \end{aligned}$$

In any math equation, from left to right, multiplication and division must be calculated first. If there are both multiplication and division in an equation, you can calculate from left to right. Then from left to right addition and subtraction must be calculated next.

1 Write the formula for calculations and find the answers.

1 $30 + 70 \times 4 = 30 + 280 = 310$ 2 $15 + 25 \times 3 = 15 + 75 = 90$

3 $45 + 30 \div 5 = 45 + 6 = 51$ 4 $90 - 48 \div 6 = 90 - 8 = 82$

Example 2 My friend bought an eraser that costs 80 zeds for two and 3 piece of paper each of which costs 15 zeds. What is the total price? (*zed(s)* is the fictional currency unit.)

The total price of pencils: $80 \div 2 = 40$ (zeds)
The total price of paper: $15 \times 3 = 45$ (zeds)

How to calculate " $80 \div 2 + 15 \times 3$ ".

$$\begin{aligned} 80 \div 2 + 15 \times 3 &= 40 + 45 \\ &= 85 \end{aligned}$$

2 Write the formula for calculations and find the answers.

1 $60 \div 3 + 25 \times 2 = 20 + 50 = 70$ 2 $36 \div 4 + 5 \times 7 = 9 + 35 = 44$

3 $20 \times 8 - 40 \div 4 = 160 - 10 = 150$ 4 $50 \times 3 - 81 \div 9 = 150 - 9 = 141$

8 - 4 Properties of Operations

Order of Operations (4)

Example Solve the following equations.

1 $6 \times 8 - 4 \div 2 = 48 - 2 = 46$

2 $6 \times (8 - 4) \div 2 = 6 \times 4 \div 2 = 24 \div 2 = 12$

3 $6 \times (8 - 4 \div 2) = 6 \times (8 - 2) = 6 \times 6 = 36$

The order of operations requires that calculations are done in this order.

- Calculate from left to right.
- Calculates inside the () are done first.
- \times and \div must be calculated before $+$ and $-$.

Solve the following equations. Show your work by following the order of operations.

1 $7 \times 8 - 6 \div 2 = 56 - 3 = 53$

2 $7 \times (8 - 6) \div 2 = 7 \times 2 \div 2 = 14 \div 2 = 7$

3 $7 \times (8 - 6 \div 2) = 7 \times (8 - 3) = 7 \times 5 = 35$

4 $(7 \times 8 - 6) \div 2 = (56 - 6) \div 2 = 50 \div 2 = 25$

5 $8 \times 20 - 12 \div 4 = 160 - 3 = 157$

6 $8 \times (20 - 12) \div 4 = 8 \times 8 \div 4 = 64 \div 4 = 16$

7 $8 \times (20 - 12 \div 4) = 8 \times (20 - 3) = 8 \times 17 = 136$

8 $(8 \times 20 - 12) \div 4 = (160 - 12) \div 4 = 148 \div 4 = 37$

9 $6 \times 9 - 15 \div 3 = 54 - 5 = 49$

10 $6 \times (9 - 15 \div 3) = 6 \times (9 - 5) = 6 \times 4 = 24$

8 - 5 Properties of Operations
Properties of Operations (1)

Instruction How to calculate the total number of dots.

Two students thought as follows:

Student A	Student B
$(5 + 3) \times 12$	$5 \times 12 + 3 \times 12$
$= 8 \times 12$	$= 60 + 36$
$= 96$	$= 96$

Answer 96 dots Answer 96 dots

The properties of operations that apply to math sentences with () include the following:

This is called the distributive property.

$$(a + b) \times c = a \times c + b \times c$$

$$(a - b) \times c = a \times c - b \times c$$

$$(a + b) \div c = a \div c + b \div c$$

$$(a - b) \div c = a \div c - b \div c$$

Example Simplifying larger numbers can make calculations easier using the distributive property.

$$109 \times 5 = (100 + 9) \times 5 = 100 \times 5 + 9 \times 5 = 500 + 45 = 545$$

Calculate the following by making the calculation simpler. Think about how to solve the problem (4)!

- $103 \times 8 = (100 + 3) \times 8 = 100 \times 8 + 3 \times 8 = 800 + 24 = 824$
- $104 \times 6 = (100 + 4) \times 6 = 100 \times 6 + 4 \times 6 = 600 + 24 = 624$
- $105 \times 7 = (100 + 5) \times 7 = 100 \times 7 + 5 \times 7 = 700 + 35 = 735$
- $99 \times 4 = (100 - 1) \times 4 = 100 \times 4 - 1 \times 4 = 400 - 4 = 396$

8 - 6 Properties of Operations
Properties of Operations (2)

Instruction There are two more properties of operations:

This is called the commutative property.

$$a + b = b + a$$

$$a \times b = b \times a$$

This is called the associative property.

$$(a + b) + c = a + (b + c)$$

$$(a \times b) \times c = a \times (b \times c)$$

Example Use the commutative or associative property to solve.

- $29 + 17 + 3 = 29 + (17 + 3) = 29 + 20 = 49$
- $73 \times 4 \times 25 = 73 \times (4 \times 25) = 73 \times 100 = 7300$

We can calculate much easier if using this property.

Use the commutative or associative property to solve.

- $45 + 88 + 12 = 45 + (88 + 12) = 45 + 100 = 145$
- $67 + 76 + 24 = 67 + (76 + 24) = 67 + 100 = 167$
- $38 + 53 + 47 = 38 + (53 + 47) = 38 + 100 = 138$
- $16 \times 4 \times 25 = 16 \times (4 \times 25) = 16 \times 100 = 1600$
- $42 \times 25 \times 4 = 42 \times (25 \times 4) = 42 \times 100 = 4200$
- $25 \times 39 \times 4 = 25 \times 4 \times 39 = 100 \times 39 = 3900$
or $39 \times 25 \times 4 = 39 \times 100 = 3900$

8 - 7 Properties of Operations
Order of Operations (3)

Example 1 When a number is a multiple of 10, it can be simplified to make calculations easier to solve. Find the answer based on $3 \times 6 = 18$.

- $3 \times 60 = 3 \times (6 \times 10) = 3 \times 6 \times 10 = 18 \times 10 = 180$
- $3 \times 60 = (3 \times 10) \times (6 \times 10) = 3 \times 6 \times 10 \times 10 = 18 \times 100 = 1800$

$3 \times 6 = 18$	$3 \times 6 = 18$
$\downarrow 10 \text{ times}$	$\downarrow 10 \text{ times}$
$3 \times 60 = 180$	$30 \times 60 = 1800$

- In multiplication, when the multiplier becomes 10 times as much, the product will also become 10 times as much.
- Also, if both multiplicand and multiplier become 10 times as much, the product becomes 100 times as much.

- Find the answers based on $8 \times 7 = 56$.
 - $80 \times 7 = (8 \times 10) \times 7 = (8 \times 7) \times 10 = 56 \times 10 = 560$
 - $8 \times 70 = 8 \times (7 \times 10) = (8 \times 7) \times 10 = 56 \times 10 = 560$
 - $80 \times 70 = (8 \times 10) \times (7 \times 10) = (8 \times 7) \times 10 \times 10 = 56 \times 100 = 5600$

Example 2 Find the answer based on $6 \times 7 = 42$

$$6 \times 35 = 6 \times (7 \times 5) = (6 \times 7) \times 5 = 42 \times 5 = 210$$

- Find the answers based on $4 \times 5 = 20$.
 - $4 \times 45 = 4 \times (5 \times 9) = (4 \times 5) \times 9 = 20 \times 9 = 180$
 - $5 \times 28 = 5 \times (4 \times 7) = (5 \times 4) \times 7 = 20 \times 7 = 140$

8 - 8 Properties of Operations
Properties of Operations (4)

Example Write the correct math symbols (+ , - , × , ÷) to make the following math sentences correct.

- $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 0 \Rightarrow 4 \times (3 - 2 - 1) = 0$
- $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 1 \Rightarrow (4 - 3) \times (2 - 1) = 1$

Write the correct math symbols (+ , - , × , ÷) in the \bigcirc to make the math sentence correct. Use () if needed.

How many problems can you solve? Let's think about various cases.

- Examples**
- $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 2 \Rightarrow (4 - 3) + 2 - 1 = 2$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 3 \Rightarrow (4 - 3) \times 2 + 1 = 3$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 4 \Rightarrow 4 - 3 + 2 + 1 = 4$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 5 \Rightarrow 4 + 3 - 2 \div 1 = 5$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 6 \Rightarrow 4 + 3 - 2 + 1 = 6$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 7 \Rightarrow 4 \times 3 \div 2 + 1 = 7$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 8 \Rightarrow 4 + 3 + 2 - 1 = 8$
 - $4 \bigcirc 3 \bigcirc 2 \bigcirc 1 = 9 \Rightarrow 4 + 3 \times 2 - 1 = 9$

8 - 9

Properties of Operations

Review

1 Read the following questions. Write out the math sentence and solve.

1 An electronics store had 30 mobile phones for sale. Sixteen mobile phones were sold yesterday and 11 mobile phones were sold today. How many mobile phones remain for sale at the electronics store?

Math sentence $30 - (16 + 11) = 30 - 27 = 3$ Answer 3 mobile phones

2 Melons can be packed into a box 4 deep and 5 wide. How many boxes do we need to hold 80 melons?

Math sentence $80 \div (4 \times 5) = 80 \div 20 = 4$ Answer 4 boxes

2 Solve the problem. Show your work by following the order of operations.

- | | |
|---|---|
| 1 $50 + 40 \times 3$
$= 50 + 120$
$= 170$ | 2 $200 - 72 \div 8$
$= 200 - 9$
$= 191$ |
| 3 $20 \times 3 + 24 \div 6$
$= 60 + 4$
$= 64$ | 4 $36 \div 4 - 20 \div 5$
$= 9 - 4$
$= 5$ |

3 Simplify the problems and then calculate them.

Examples

- | | |
|-----------------------------|---|
| 1 $68 \times 4 \times 25 =$ | $68 \times (4 \times 25) = 68 \times 100 = 6800$ |
| 2 $25 \times 53 \times 4 =$ | $25 \times 4 \times 53 = 100 \times 53 = 5300$ |
| 3 $103 \times 9 =$ | $(100 + 3) \times 9 = 100 \times 9 + 3 \times 9 = 900 + 27 = 927$ |
| 4 $108 \times 7 =$ | $(100 + 8) \times 7 = 100 \times 7 + 8 \times 7 = 700 + 56 = 756$ |
| 5 $89 + 56 + 44 =$ | $89 + (56 + 44) = 89 + 100 = 189$ |

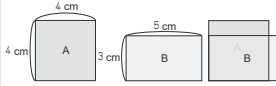
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9 - 1

Area

How to Express an Amount of Space

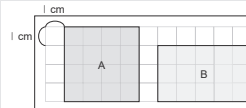
Instruction Which one is bigger?



Square A looks bigger, but the sum of the lengths of all sides is the same.
Square A: $4 \times 4 = 16$ cm
Rectangle B: $(5 + 3) \times 2 = 16$ cm

How about laying graph paper with 1 cm square sides underneath and counting the number of squares?

Example Compare the size of Square A and Rectangle B by counting the number of squares.



Square A has 16 squares.

Rectangle B has 15 squares.

- The size of a figure is called its "area".
- The area of a square with 1 cm side is 1 square centimeter, and it is written as 1 cm².
- "Square centimeter" is a unit of area.

Square A has an area of 16 cm² and Rectangle B has an area of 15 cm².

Thus, the extent of Square A is larger than Rectangle B.

Find the area of the rectangle and the square below.

- 1 How many 1 cm squares are there? 4 1 cm square sides.
- 2 How much cm² is it? 4 cm².
-
- 10 1 cm squares.
- 10 cm².
-

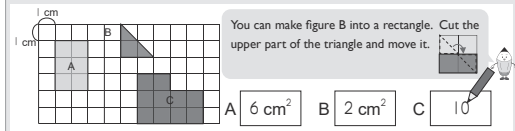
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9 - 2

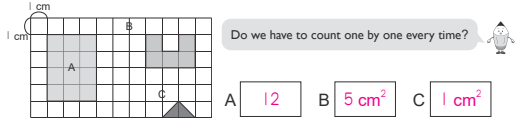
Area

Area of Rectangles and Squares

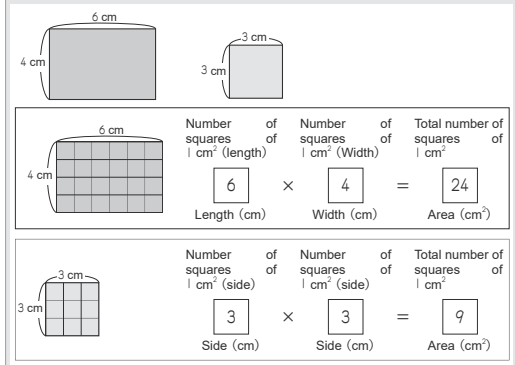
Example 1 Find the area of each figure below in cm².



1 Find the area of each figure below in cm².



Instruction How to find the area of quadrilaterals.



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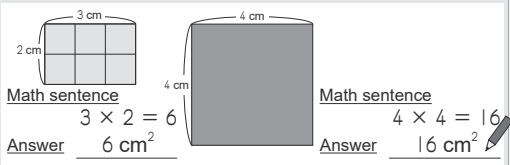
The number of 1 cm² squares along the horizontal and the vertical sides are the same as the lengths of those sides.

(Area of Rectangle) = (Length) × (Width)
= (Width) × (Length)

(Area of Square) = (Length of Side) × (Length of Side)

In a square, the lengths of the horizontal and vertical sides are the same in a square.

Example 2 Find the area of the following figures.



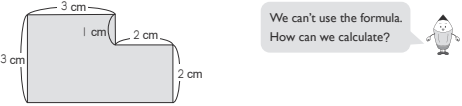
2 Find the area of the following figures.

- 1 12 cm². Math sentence $4 \times 3 = 12$
- 2 14 cm². Math sentence $7 \times 2 = 14$
- 3 25 cm². Math sentence $5 \times 5 = 25$

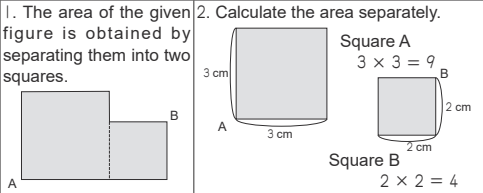
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9 - 3 Area **Area of Various Figures**

Example Find the coloured area of the following figures.



We can't use the formula. How can we calculate?



3. Add the two areas. $9 + 4 = 15$ 15 cm²

1 Find the coloured area of the following figures.

1 **Math sentence** $(4 \times 2) + (3 \times 2) = 14$
Answer 14 cm²

2 **Math sentence** $(5 \times 1) + (3 \times 2) = 11$
Answer 11 cm²

For alternative solution
Math sentence $(3 \times 1) + (4 \times 2) = 11$

Example 2 Find the area of the following figures. Match the math sentence and figures.

$(3 \times 1) + (6 \times 2) = 15$
15 cm²

$(3 \times 3) + (3 \times 2) = 15$
15 cm²

$(6 \times 5) \div 2 = 15$
15 cm²

$(6 \times 3) - (3 \times 1) = 15$
15 cm²

2 Find the area of the following figures. Match the math sentence and figures.

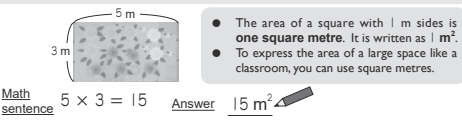
$(3 \times 1) + (2 \times 2) = 7$
7 cm²

$(1 \times 1) + (3 \times 2) = 7$
7 cm²

$(3 \times 3) - (2 \times 1) = 7$
7 cm²

9 - 4 Area **Large Areas (m² and km²)**

Example 1 Find the area of the following flowerbed.

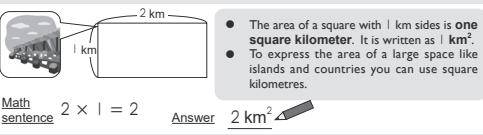


1 Find the area of the following figures.

1 **Math sentence** $6 \times 4 = 24$
Answer 24 m²

2 **Math sentence** $5 \times 5 = 25$
Answer 25 m²

Example 2 Find the area of a local market. It has 1 km and 2 km long side.



2 Find the area of the following figures.

1 **Math sentence** $7 \times 4 = 28$
Answer 28 km²

2 **Math sentence** $6 \times 6 = 36$
Answer 36 km²

Other units of area are as follows:

- The area of a square with 10 m sides is called **one are**. It is written as 1 a. $10 \text{ m} \times 10 \text{ m} = 100 \text{ m}^2 = 1 \text{ a}$
- The area of a square with 100 m sides is **one hectare**, and it is written as 1 ha. $100 \text{ m} \times 100 \text{ m} = 10000 \text{ m}^2 = 1 \text{ ha}$

9 - 5 Area **Relation between Units of Areas**

Example 1 Find the following areas with specified unit in ().

1 A rectangle with 30 m length and 20 m width (a)

Math sentence $3 \times 2 = 6$ **Answer** 6 a

2 A square with 200 m sides (ha)

Math sentence $2 \times 2 = 4$ **Answer** 4 ha

1 Find the area of the following figures with specified unit in ().

1 A rectangle with 80 m length and 30 m width (a)

Math sentence $8 \times 3 = 24$ **Answer** 24 a

2 A square with 300 km sides (ha)

Math sentence $3 \times 3 = 9$ **Answer** 9 ha

Example 2 Fill in the blank with numbers to see the relation between the length of a side and the area of a square.

	10 times	10 times	
Length of a side	1 cm	10 cm	1 m (100 cm)
Area	1 cm ²	100 cm ²	10000 cm ²
	100 times	100 times	

2 Fill in the blank with numbers to see the relation between the length of a side and the area of a square.

	10 times	10 times	
Length of a side	10 m	100 m	1 km (1000 m)
Area	1 a (100 m ²)	1 ha (10000 m ²)	1 km ² (1000000 m ²)
	100 times	100 times	

9 - 6 Area **Review**

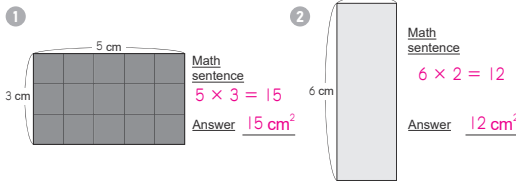
1 Fill in each of the with a unit of area or a word.

- ① Area of a rectangle = length ×
- ② Area of a square = ×
- ③ The area of a square with 1 cm sides is
- ④ The area of a square with 1 m sides is
- ⑤ The area of a square with 1 km sides is

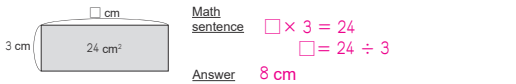
2 Find the area of each coloured figure below in cm^2 .



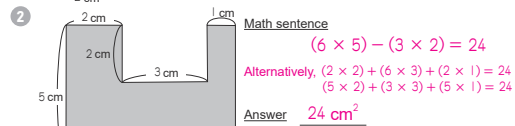
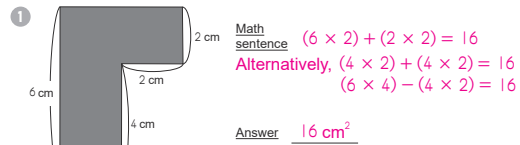
3 Find the area of the following figures.



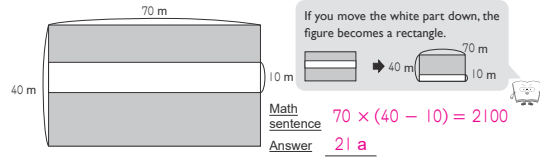
4 I want to make a rectangle with an area of 24 cm^2 and a width of 3 cm. How many cm should the length be?



5 Find the coloured area of the following figures.



6 In the following rectangular field, the width of the path is 10 m. How many a is the area of the field?



7 Find the area of the following figures with specified unit in ().

- ① A rectangle with 20 m length and 10 m width (a)
Math sentence $1 \times 2 = 2$
Answer
- ② A rectangle with east-west 2000 m and north-south 4 km (km^2)
Math sentence $2000 \text{ m} = 2 \text{ km}$
 $4 \times 2 = 8$
Answer

10 - 1 How to Organize Data **Organize Data in a Table (1)**

Example The table below shows a report on an injuries incurred by students in a week. Organize the table based on the type of injury and the location where it occurred.

Injury Report

Grade	Type of injury	Location	Grade	Type of injury	Location
5	Scrape	Playground	3	Scrape	Playground
3	Bruise	Stairs	2	Scrape	Classroom
4	Sprain	Gym	3	Bruise	Gym
2	Cut	Classroom	1	Sprain	Gym

	Scrape	Cut	Bruise	Sprain	Total
Playground	2	0	0	0	2
Gym	0	0	1	2	3
Classroom	1	1	0	0	2
Stairs	0	0	1	0	1
Total	3	1	2	2	8

Tally the report and write the number on the table.

The table below shows the number of injuries for one week. Organize the table based on the type of injury and the location where it occurred.

Injury Report

Grade	Type of injury	Location	Grade	Type of injury	Location
5	Scrape	Playground	5	Scrape	Playground
3	Bruise	Playground	3	Bruise	Stairs
4	Sprain	Classroom	4	Scrape	Playground
2	Cut	Classroom	2	Cut	Classroom
4	Cut	Playground	1	Sprain	Gym
1	Scrape	Playground	6	Scrape	Classroom
4	Sprain	Gym	2	Sprain	Playground

	Scrape	Cut	Bruise	Sprain	Total
Playground	4	1	1	1	7
Gym	0	0	0	2	2
Classroom	1	2	0	1	4
Stairs	0	0	1	0	1
Total	5	3	2	4	14

I wonder what kind of injuries are common and where they occurred?
How can we take actions to reduce injuries in playground?

10 - 2 How to Organize Data **Organize Data in a Table (2)**

Example The table below shows the types of injuries that occurred at school last month, focusing on the places where the injuries occurred and the kind of injuries. Answer the following questions based on the information in the table.

	Cut	Bruise	Scratch	Sprain	Total
Playground	1	4	3	1	9
Corridor	2	3	2	0	7
Classroom	4	1	3	0	8
Gymnasium	1	2	4	2	9
Total	8	10	12	3	33

- ① Fill in the blanks of the table above.
- ② How many children had sprains at the gymnasium?
- ③ What kind of injuries most occurred?

The table below shows the kinds of books and the number of books borrowed one day. Answer the following questions.

	G1	G2	G3	G4	G5	G6	Total
Story	7	5	6	5	8	10	41
History	4	2	5	8	10	10	39
Encyclopedia	0	2	6	8	12	9	37
Picture book	10	10	14	10	12	15	71
Total	21	19	31	31	42	44	188

- ① Fill in the blanks.
- ② What kinds of books borrowed the most?
- ③ Which grades of students borrowed the books least?

10 - 3

How to Organize Data

Review

1 The following record shows the lunch food and drinks ordered in a café. The owner will consider discounting the most sold combi as a promotion.

Food	Drink	Food	Drink	Food	Drink
Hot dog	Soda	Hot dog	Soda	Sushi roll	Water
Pizza	Soda	Pizza	Soda	Hot dog	Tea
Rice ball	Tea	Pizza	Tea	Rice ball	Tea
Hot dog	Soda	Rice ball	Water	Hot dog	Soda
Pizza	Water	Rice ball	Soda	Rice ball	Water

Summarize in the following table below.

	Hot dog	Pizza	Rice ball	Sushi roll	Total
Soda	4	2	1	0	7
Tea	1	1	2	0	4
Water	0	1	2	1	4
Total	5	4	5	1	15

2 A class survey on brothers and sisters was conducted. There were 35 students in the class. 12 students have older brothers and 18 students have older sisters and 5 students also have older brothers.

	Older brother		Total
	Yes	No	
Older sister			
Yes	5	13	18
No	7	10	17
Total	12	23	35

Look at the first row. The total number is 18 and 5 students have older sister and older brother. So, you can find the number of students who have older sisters but do not have older brothers by calculation.

1 Find the number of students who do not have older brothers but have older sisters.

13 students

2 Find the number of students who have only older brother.

7 students

3 Complete the table above.

108

11 - 1

Decimal Numbers-1

How to Express Decimal Numbers (1)

Instruction

$\frac{1}{10}$ of 0.1 L is written as 0.01 L.
It is read as "zero point zero one litres."

$\frac{1}{10}$ of 0.01 L is written as 0.001 L.
It is read as "zero point zero zero one litres."

$\frac{1}{10}$ of 0.1 m is written as 0.01 m.
It is read as "zero point zero one metres."

$\frac{1}{10}$ of 0.01 m is written as 0.001 metres.
It is read as "zero point zero zero one metres."

Example How many litres of water are in the containers shown below?

0.1 L 0.1 L

This is read as "zero point two four litres".

0.24 L

Answer the following the amount of water and length of tapes.

1 0.28 L

2 0.31 L

3 0.14 m

11 - 2

Decimal Numbers-1

How to Express Decimal Numbers (2)

Example 1 How many 0.01 L are needed to make 0.05 L, 0.09 L and 0.1 L, respectively?

0.05 L is made of 5 0.01 L.

0.09 L is made of 9 0.01 L.

0.1 L is made of 10 0.01 L.

One 0.01 L is 0.01 L.
Two 0.01 L is 0.02 L.

Answer the following questions.

1 How many 0.01 L are needed to make 0.04 L, 0.07 L, 0.12 L, and 1.23 L, respectively?

0.04 L is made of 4 0.01 L. 0.07 L is made of 7 0.01 L.

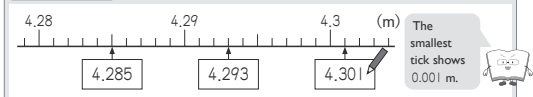
0.12 L is made of 12 0.01 L. 1.23 L is made of 123 0.01 L.

2 How many 0.001 m are needed to make 0.006 m, 0.008 m, 0.01 m, 0.1 m, respectively?

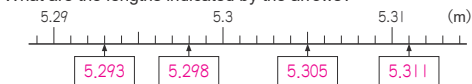
0.006 m is made of 6 0.001 m. 0.008 m is made of 8 0.001 m.

0.01 m is made of 10 0.001 m. 0.1 m is made of 100 0.001 m.

Example 2 What are the lengths indicated by the arrows?



What are the lengths indicated by the arrows?



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11 - 3

Decimal Numbers-1

How to Express Decimal Numbers (3)

Instruction Think about the relations between km and m, and kg and g.

The relation between km and m:	The relation between kg and g:
1000 m = 1 km	1000 g = 1 kg
100 m ($\frac{1}{10}$ of 1 km) = 0.1 km	100 g ($\frac{1}{10}$ of 1 kg) = 0.1 kg
10 m ($\frac{1}{10}$ of 0.1 km) = 0.001 km	10 g ($\frac{1}{10}$ of 0.1 kg) = 0.001 kg
1 m ($\frac{1}{10}$ of 0.01 km) = 0.0001 km	1 g ($\frac{1}{10}$ of 0.01 kg) = 0.0001 kg

Example Convert the following to km or kg as indicated next to the answer box.

1 3 km 500 m (km) 3.5 km 2 750 g (kg) 0.75 kg

Convert the following to km or kg as indicated next to the answer box.

- 2 km 400 m (km) 2.4 km
- 1 km 550 m (km) 1.55 km
- 3 km 30 m (km) 3.03 km
- 500 m (km) 0.5 km
- 950 m (km) 0.95 km
- 680 m (km) 0.68 km
- 4 kg 500 g (kg) 4.5 kg
- 1 kg 250 g (kg) 1.25 kg
- 2 kg 300 g (kg) 2.3 kg
- 900 g (kg) 0.9 kg
- 750 g (kg) 0.75 kg
- 880 g (kg) 0.88 kg

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11 - 4 Decimal Numbers-I

Structure of Decimal Numbers (1)

Instruction The relationship between 1, 0.1, 0.01, and 0.001 are as follows:

Decimal numbers are just like whole numbers.	$\frac{1}{10}$	10	← 10 times
	$\frac{1}{10}$	1	← 10 times
	$\frac{1}{10}$	0.1	← 10 times
	$\frac{1}{10}$	0.01	← 10 times
	$\frac{1}{10}$	0.001	← 10 times

Example Write appropriate numbers in the .

- 10 times of 0.1 is .
- 100 times of 0.1 is .

Write appropriate numbers in the .

- 10 times of 0.01 is .
- 100 times of 0.01 is .
- 1000 times of 0.01 is .
- $\frac{1}{10}$ of 0.1 is .
- $\frac{1}{100}$ of 0.1 is .
- $\frac{1}{10}$ of 0.01 is .
- $\frac{1}{100}$ of 0.01 is .

You can look carefully at the above instruction to solve these problems.

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11 - 5 Decimal Numbers-I

Structure of Decimal Numbers (2)

Example 2.34 is made of 234 units of 0.01's.

2 is equal to 200 0.01's.
 0.3 is equal to 30 0.01's.
 0.4 is equal to 4 0.01's.
 2.34 is made of 234 0.01's.

The structure of decimal numbers are just like whole numbers.

Example Write appropriate numbers in the .

- 0.03 is equal to 0.01's.
- 16 units of 0.01's is equal to .

Write appropriate numbers in the .

- 0.05 is equal to 0.01's.
- 7 units of 0.01's is equal to .
- 0.63 is equal to 0.01's.
- 18 units of 0.01's is equal to .
- 1.37 is equal to 0.01's.
- 234 units of 0.01's is equal to .
- 3.04 is equal to 0.01's.
- 105 units of 0.01's is equal to .
- 0.1 is equal to 0.01's.
- 10 units of 0.01's is equal to .
- 1 is equal to 0.01's.
- 100 units of 0.01's is equal to .

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11 - 6 Decimal Numbers-I

Structure of Decimal Numbers (3)

Example Put the following numbers on the number line. Then fill in the boxes using the letter in the correct order.

① 2.43 ② 2.48 ③ 2.41 ④ 2.495 ⑤ 2.458

< < < <

Put the following numbers on the number line. Then fill in the boxes using the letter in the correct order.

- ① 0.09 ② 0 ③ 0.07 ④ 0.025 ⑤ 0.045

< < < <

- ① 0.74 ② 0.71 ③ 0.73 ④ 0.775 ⑤ 0.796

< < < <

- ① 0.33 ② 0.31 ③ 0.387 ④ 0.342 ⑤ 0.365

< < < <

114

11 - 7 Decimal Numbers-I

Structure of Decimal Numbers (4)

Example Solve the word problem and write the answer in the box. Mark where the answer belongs on the number line.

- 3 and 0.65 together
- 0.03 less than 4

Solve the word problem and write the answer in the box. Mark where the answer belongs on the number line.

- 5 and 0.46 together
- 0.05 less than 6
- 0.38 less than 6
- 0.02 greater than 5
- 0.11 greater than 5
- Five 1's, three 0.1's and eight 0.01's together
- 586 units of 0.01's together
- 525 units of 0.01's together

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11 - 8 Decimal Numbers-1
Structure of Decimal Numbers (5)

Instruction The first place to the right of the decimal point is called the **Tenths Place** (or the first decimal place) as we have already learnt. The second place to the right of the decimal point is called the **Hundredths Place** ($\frac{1}{100}$'s Place (or the second decimal place). It is equal to $\frac{1}{100}$. The third place to the right of the decimal point is called the **Thousandths Place** ($\frac{1}{1000}$'s Place (or the third decimal place). It is equal to $\frac{1}{1000}$.

Ones Place	Tenths Place	Hundredths Place	Thousandths Place
2	3	4	5

Decimal Point
A decimal place to the left is multiplied by 10. A decimal place to the right is multiplied by $\frac{1}{10}$.

Example What is 2.34 multiplied by 10?
What is 2.34 multiplied by $\frac{1}{10}$?

Tens Place	Ones Place	Tenths Place	Hundredths Place	Thousandths Place
2	3	4		
	2	3	4	
		2	3	4
10 times	23.4			
		$\frac{1}{10}$	0.234	

Answer the following questions.

- 1 What is 4.12 multiplied by 10? 41.2
- 2 What is 0.284 multiplied by 100? 28.4
- 3 What is 1.35 multiplied by $\frac{1}{10}$? 0.135
- 4 What is 1.54 multiplied by $\frac{1}{100}$? 0.0154

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11 - 9 Decimal Numbers-1
Addition of Decimal Numbers (1)

Example Calculate $1.75 + 2.64$ by using the addition algorithm.

1.75	+	2.64	=	4.39
1	.	7	5	
+		2	.	6
		4		3
				9

Write the two numbers so that the places are lined up.

Calculate as if we were adding whole numbers.

Place the decimal point in the same place as the other two numbers.

Calculate the following problems by using the addition algorithm.

- 1 $2.47 + 4.32$
- 2 $1.83 + 2.65$
- 3 $1.45 + 0.71$
- 4 $7.62 + 1.29$
- 5 $2.64 + 3.17$
- 6 $0.65 + 1.58$
- 7 $8.55 + 0.76$
- 8 $5.73 + 1.48$
- 9 $6.12 + 0.99$
- 10 $26.73 + 12.81$
- 11 $4.945 + 0.371$
- 12 $6.809 + 7.272$

Even if the number of digits increases, it can be calculated in the same way as a whole number.

- | | | | | | | | | | |
|---|------|----|-------|----|-------|----|--------|---|------|
| 4 | 8.91 | 5 | 5.81 | 6 | 2.23 | 7 | 9.31 | 8 | 7.21 |
| 9 | 7.11 | 10 | 39.54 | 11 | 5.316 | 12 | 14.081 | | |

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11 - 10 Decimal Numbers-1
Addition of Decimal Numbers (2)

Example Calculate $0.526 + 0.374$ by using the addition algorithm.

0.526	+	0.374	=	0.900
0	.	5	2	6
+		0	.	3
		7	4	
				0
				0

Write the two numbers so that the places are lined up.

Disregard the first "0" of the numbers and calculate as if we were adding whole numbers.

Place the decimal point in the same place as the other two numbers. With decimals, any to the right of the last digit can be crossed out.

Calculate the following problems by using the addition algorithm. Cross out any unnecessary zeros.

- 1 $0.56 + 0.34$
- 2 $3.29 + 1.51$
- 3 $0.139 + 0.241$
- 4 $3.249 + 0.541$
- 5 $0.074 + 0.586$
- 6 $0.157 + 2.623$
- 7 $2.734 + 1.186$
- 8 $1.384 + 4.516$
- 9 $0.147 + 0.753$
- 10 $1.249 + 4.351$
- 11 $3.725 + 1.175$
- 12 $0.341 + 3.659$

- | | | | | | | | | | |
|---|------|----|------|----|------|----|------|---|-----|
| 4 | 3.79 | 5 | 0.66 | 6 | 2.78 | 7 | 3.92 | 8 | 5.9 |
| 9 | 0.9 | 10 | 5.6 | 11 | 4.9 | 12 | 4 | | |

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11 - 11 Decimal Numbers-1
Addition of Decimal Numbers (3)

Example Calculate $3.6 + 0.835$ by using the addition algorithm.

3.6	+	0.835	=	4.435
3	.	6		
+		0	.	8
		3	5	
				5

Write the two numbers so that the places are lined up.

Think of 3.6 as 3.600. Calculate as if we were adding whole numbers.

Place the decimal point in the same place as the other two numbers.

Calculate the following problems by using the addition algorithm.

- 1 $2.8 + 0.34$
- 2 $4.5 + 2.53$
- 3 $1.6 + 0.948$
- 4 $5.3 + 0.761$
- 5 $2.8 + 5.325$
- 6 $1.2 + 3.845$
- 7 $3.1 + 0.96$
- 8 $18.5 + 1.57$
- 9 $59.3 + 0.78$
- 10 $25.2 + 3.86$
- 11 $21 + 9.46$
- 12 $1 + 9.96$

Writing a 0 to align the numbers in the decimal places makes it easier to calculate.

- | | | | | | | | | | |
|---|-------|----|-------|----|-------|----|-------|---|-------|
| 4 | 6.061 | 5 | 8.125 | 6 | 5.045 | 7 | 4.06 | 8 | 20.07 |
| 9 | 60.08 | 10 | 29.06 | 11 | 30.46 | 12 | 10.96 | | |

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11 - 12 Decimal Numbers-I Subtraction of Decimal Numbers (1)

Example Calculate $3.64 - 2.76$ by using the subtraction algorithm.

Write the two numbers so that the places are lined up.

Calculate as if we were subtracting whole numbers.

Place the decimal point in the same place as the other two numbers.

Calculate the following problems by using the subtraction algorithm.

- 1 $4.56 - 2.34$ 2 $3.26 - 2.48$ 3 $6.85 - 4.96$
- 4 $4.03 - 0.86$ 5 $2.41 - 1.85$ 6 $7.36 - 5.47$
- 7 $8.23 - 6.84$ 8 $5.84 - 4.89$ 9 $1.24 - 0.99$
- 10 $48.85 - 27.96$ 11 $37.24 - 5.95$ 12 $0.927 - 0.688$

4	3.17	5	0.56	6	1.89	7	1.39	8	0.95
9	0.25	10	20.89	11	31.29	12	0.239		

120

11 - 13 Decimal Numbers-I Subtraction of Decimal Numbers (2)

Example Calculate $0.8 - 0.35$ by using the subtraction algorithm.

Write the two numbers so that the places are lined up.

Think of 0.8 as 0.80. Disregard the first "0" of the numbers and calculate as if we were subtracting whole numbers.

Place the decimal point in the same place as the other two numbers.

Use 0 as necessary to subtract correctly.

Calculate the following problems by using the subtraction algorithm.

- 1 $0.6 - 0.37$ 2 $4.5 - 0.25$ 3 $5.3 - 3.16$
- 4 $3.2 - 1.56$ 5 $5.4 - 3.69$ 6 $1.4 - 0.87$
- 7 $6.2 - 4.56$ 8 $8.6 - 7.59$ 9 $0.2 - 0.15$
- 10 $10.6 - 9.86$ 11 $1.83 - 0.936$ 12 $1.14 - 1.137$

Like the addition algorithm, writing a 0 to align the numbers in the decimal places makes it easier to calculate.

4	1.64	5	1.71	6	0.53	7	1.64	8	1.01
9	0.05	10	0.74	11	0.894	12	0.003		

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11 - 14 Decimal Numbers-I Subtraction of Decimal Numbers (3)

Example Calculate $3 - 0.456$ by using the subtraction algorithm.

Write the two numbers so that the places are lined up.

Think of 3 as 3.000. Calculate as if we were subtracting whole numbers.

Place the decimal point in the same place as the other two numbers.

Use 0 as necessary to subtract correctly.

Calculate the following problems by using the subtraction algorithm.

- 1 $5 - 0.25$ 2 $7 - 3.46$ 3 $3 - 1.19$
- 4 $6 - 5.36$ 5 $1 - 0.61$ 6 $8 - 7.94$
- 7 $2 - 1.87$ 8 $4 - 3.18$ 9 $10 - 9.21$
- 10 $42 - 9.96$ 11 $9 - 0.036$ 12 $2 - 1.097$

You can write a 0 to align the numbers in the decimal places. Then you can calculate it easier.

4	0.64	5	0.39	6	0.06	7	0.13	8	0.82
9	0.79	10	32.04	11	8.964	12	0.903		

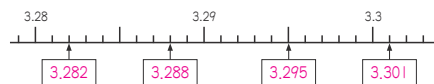
122

11 - 15 Decimal Numbers-I Review

1 Write the answers in the .

- 1 3.46 is equal to 3 and together.
- 2 1.23 is less than 1.3.
- 3 2.34 is equal to 1's, 0.1's, and 0.01's together.
- 4 1.234 is equal to 0.001's.

2 Write the number in the that the arrow points to on the number line.



3 Answer the following problems.

- 1 What number is 100 times as much as 0.678?
- 2 What number is $\frac{1}{10}$ of 0.35?

4 Calculate the following by using the algorithm.

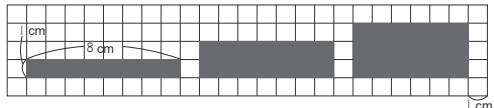
- 1 $0.48 + 1.37$ 2 $2.67 + 4.47$ 3 $5.84 + 1.69$
- 4 $0.76 + 2.47$ 5 $1.273 + 3.817$ 6 $2 + 9.68$
- 7 $2.35 - 1.17$ 8 $5.95 - 3.86$ 9 $6.4 - 2.17$
- 10 $8.1 - 7.13$ 11 $5 - 3.999$ 12 $1 - 0.879$

1	1.85	2	7.14	3	7.53	4	3.23
5	5.09	5	11.68	7	1.18	8	2.09
9	4.23	10	0.97	11	1.001	12	0.121

123

12-1 Change Log (1)

Example 1 Draw various rectangles with a perimeter of 18 cm.



- Summarize the relationship between Length and width in the table.

Length	1	2	3	4	5	6	7	8
Width	8	7	6	5	4	3	2	1

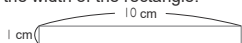
 There are two lengths and two width, so...
- If the length increase by 1 cm, how does the width change?

Decrease by 1 cm
- Looking at the table, let's make a math sentence where the length is \bigcirc cm and the width is \square .

$\bigcirc + \square = 9$
- If the length is 6 cm, what is the width?

3 cm

Make a rectangle using a piece of string 22 cm long. Find the length and the width of the rectangle.



- Summarize the relationship between the length and width in the table.

Length	1	2	3	4	5	6	7	...
Width	10	9	8	7	6	5	4	...
- If the vertical length increases by 1 cm, how does the width change?

Decrease by 1 cm
- Looking at the table, let's make a math sentence where the Length is \bigcirc cm and the Width is \square .

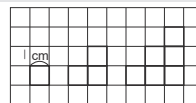
$\bigcirc + \square = 11$
- If the length is 9 cm, what is the width?

2 cm

124

12-2 Change Log (2)

Example Arrange the squares in the staircase and measure the perimeter.



- Summarize the relationship between the number of steps and the perimeter in the table.

Number of Steps	1	2	3	4	5	6	7	...
Perimeter	4	8	12	16	20	24	28	...
- Let's make a math sentence with \bigcirc for the number of steps and \square for the length of the perimeter.

$4 \times \bigcirc = \square$
- What is the perimeter of 7 steps?

28 cm
- How many steps are there when the perimeter of the steps is 32 cm?

8 steps

Arrange the equilateral triangle in a staircase and measure perimeter.



- Summarize the relationship between the number of steps and the perimeter in the table.

Number of Steps	1	2	3	4	5	6	7	...
Perimeter	3	6	9	12	15	18	21	...
- Let's make a math sentence with \bigcirc for the number of steps and \square for the perimeter.

$3 \times \bigcirc = \square$
- What is the perimeter of 8 steps?

24 cm
- How many steps are there when the perimeter of the steps is 30 cm?

10 steps

125

12-3 Change Log (3)

Example A student walk 30 m per minutes.

- Summarize the relationship between the minutes and the distance in the table below.

Minutes	0	1	2	3	4	5	...
Distance (m)	0	30	60	90	120	150	...
- How many m does student walk in a minute?

30 m
- Look at the table and draw a graph.
- If 6 minutes passed, how much will the student go?

180 m
- If the student walked 360 m, how many minutes does it take?

12 minutes

Measure the time it takes to fill a bucket with water.

- Summarize the relationship between the amount of water and the minutes needed in the table below.

Minutes	0	1	2	3	4	5	6	...
Amount of water (L)	0	5	10	15	20	25	30	...
- How much water will fill up in one minute?

5 minutes
- Look at the table and draw a graph.
- How much water will be collected in 7 minutes?

35 L
- How many minutes does it take to collect 50 liters of water?

10 minutes

126

12-4 Change Log (4) Review

1 Summarize the relationship between the length and the width of rectangle or square with perimeter of 20 cm in the table.

Length	1	2	3	4	5	6	7	...
Width	9	8	7	6	5	4	3	...

- If the length is 9 cm, what is the width?

1 cm
- If the width is 2 cm, what is the length?

8 cm

2 The hot spring gush 12 L per minutes. Write the relationship between the minutes and amount of water.

* Gush means that water comes out of the ground.

Minutes	0	1	2	3	4	5	6	...
Amount of water (L)	0	12	24	36	48	60	72	...

- Look at the table and draw a graph.
- How much water gush in one minute?

Increase by 12 L
- Let's make a math sentence with \bigcirc for the hours and \square for the amount of water.

$12 \times \bigcirc = \square$
- How much water will be gushed in 7 minutes?

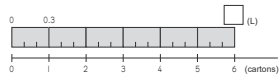
84 L
- How many minutes does it take to gush 132 liters of water?

11 minutes

127

13-1 Decimal Numbers-2 Multiplication of Decimal Numbers (1)

Example I have 6 cartons of juice. Each carton holds 0.3 L. How many L of juice do I have in total?



According to the above diagram, we can make the math sentence 0.3×6 . This multiplication problem can be solved in the following way.

$$\begin{array}{r} 0.3 \times 6 = 1.8 \\ \downarrow 10 \text{ times} \\ 3 \times 6 = 18 \end{array}$$

When the multiplicand is multiplied by 10, the product becomes 10 times of the original product. Therefore, the original product must be $\frac{1}{10}$.

Math sentence $0.3 \times 6 = 1.8$ Answer 1.8 L

1 I have 8 bottles of tea. Each bottle holds 0.7 L. How many L of tea do I have in total?

Math sentence $0.7 \times 8 = 5.6$ Answer 5.6 L

2 There are 7 ribbons. Each ribbon is 0.5 m long. How many m of ribbon are there in total?

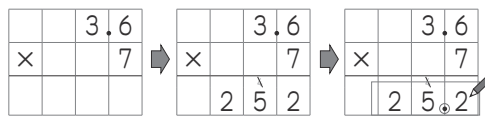
Math sentence $0.5 \times 7 = 3.5$ Answer 3.5 m

3 Calculate the following multiplication problems.

- | | | |
|------------------------|------------------------|-----------------------------|
| 1 $0.3 \times 5 = 1.5$ | 2 $0.4 \times 4 = 1.6$ | 3 $0.5 \times 6 = 3.0$ or 3 |
| 4 $0.6 \times 2 = 1.2$ | 5 $0.7 \times 6 = 4.2$ | 6 $0.8 \times 3 = 2.4$ |
| 7 $0.9 \times 7 = 6.3$ | 8 $0.2 \times 8 = 1.6$ | 9 $0.1 \times 9 = 0.9$ |

13-2 Decimal Numbers-2 Multiplication of Decimal Numbers (2)

Example Calculate 3.6×7 by using the multiplication algorithm.



When multiplying one decimal number by a whole number, disregard the decimal point. Line up the last digits of both numbers to the right.

Multiply exactly the same as if they were two whole numbers.

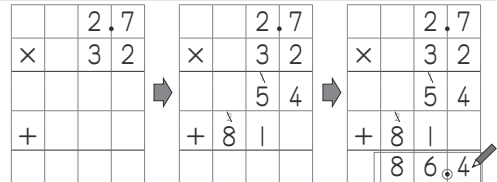
Write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand).

Calculate the following by using the multiplication algorithm.

- | | | |
|--------------------|--------------------|--------------------|
| 1 3.8×4 | 2 4.6×7 | 3 5.2×4 |
| 4 7.3×5 | 5 8.7×6 | 6 12.3×4 |
| 7 15.6×3 | 8 27.8×2 | 9 3.52×8 |
| 10 21.4×6 | 11 34.5×5 | 12 48.7×6 |
- | | | | | | | | | | |
|---|-------|----|-------|----|-------|----|-------|---|------|
| 4 | 36.5 | 5 | 52.2 | 6 | 49.2 | 7 | 46.8 | 8 | 55.6 |
| 9 | 28.16 | 10 | 128.4 | 11 | 172.5 | 12 | 292.2 | | |

13-3 Decimal Numbers-2 Multiplication of Decimal Numbers (3)

Example Calculate 2.7×32 by using the multiplication algorithm.



When multiplying one decimal number by a whole number, disregard the decimal point. Line up the last digits of both numbers to the right.

Calculate as if we were multiplying two whole numbers.

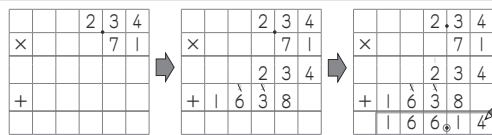
Do the addition. Then write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand).

Calculate the following by using the multiplication algorithm.

- | | | |
|--------------------|--------------------|--------------------|
| 1 2.6×12 | 2 5.3×14 | 3 1.7×46 |
| 4 3.8×23 | 5 4.2×18 | 6 5.1×19 |
| 7 4.8×29 | 8 8.6×69 | 9 5.9×48 |
| 10 3.6×76 | 11 6.2×57 | 12 7.5×83 |
- | | | | | | | | | | |
|---|-------|----|-------|----|-------|----|-------|---|-------|
| 4 | 87.4 | 5 | 75.6 | 6 | 96.9 | 7 | 139.2 | 8 | 593.4 |
| 9 | 283.2 | 10 | 273.6 | 11 | 353.4 | 12 | 622.5 | | |

13-4 Decimal Numbers-2 Multiplication of Decimal Numbers (4)

Example Calculate 2.34×71 by using the multiplication algorithm.



When multiplying one decimal number by a whole number, disregard the decimal point. Line up the last digits of both numbers to the right.

Calculate as if we were multiplying two whole numbers.

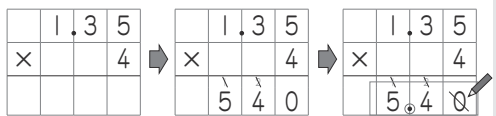
Do the addition. Then write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand).

Calculate the following by using the multiplication algorithm.

- | | | |
|---------------------|---------------------|---------------------|
| 1 2.57×62 | 2 8.41×19 | 3 2.06×73 |
| 4 1.86×84 | 5 7.36×67 | 6 8.59×39 |
| 7 3.45×63 | 8 4.56×58 | 9 5.35×43 |
| 10 6.37×76 | 11 1.97×98 | 12 2.86×79 |
- | | | | | | | | | | |
|---|--------|----|--------|----|--------|----|--------|---|--------|
| 4 | 156.24 | 5 | 493.12 | 6 | 335.01 | 7 | 217.35 | 8 | 264.48 |
| 9 | 230.05 | 10 | 484.12 | 11 | 193.06 | 12 | 225.94 | | |

13-5 Decimal Numbers-2 Multiplication of Decimal Numbers (5)

Example Calculate 1.35×4 by using the multiplication algorithm.



Line up the last digits in both numbers to be multiplying the right. Calculate as if we were multiplying two whole numbers. Write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand). Since 5.40 and 5.4 are the same, we cross out 0.



We can cross out "0" in the end of the number in the decimal places.

Write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand). Since 5.40 and 5.4 are the same, we cross out 0.

Calculate the following by using the multiplication algorithm.

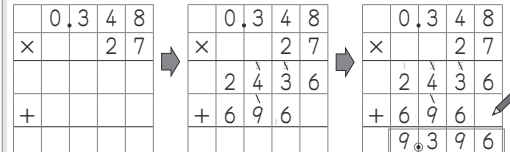
1	1.35×6	2	2.75×2	3	1.85×4
4	0.15×4	5	1.26×5	6	3.95×2
7	2.46×5	8	1.85×8	9	4.36×5
10	1.42×5	11	1.25×4	12	1.25×8

4	0.6	5	6.3	6	7.9	7	12.3	8	14.8
9	21.8	10	7.1	11	5	12	10		

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13-6 Decimal Numbers-2 Multiplication of Decimal Numbers (6)

Example Calculate 0.348×27 by using the multiplication algorithm.



Line up the last digits in both numbers to be multiplying the right. Calculate as if we were multiplying two whole numbers. Write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand).

Write the decimal point for the product directly beneath the decimal point in the top number (the multiplicand).

Calculate the following by using the multiplication algorithm.

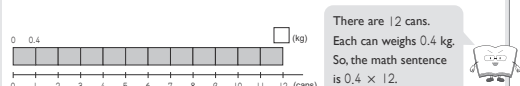
1	0.237×36	2	0.148×19	3	0.307×28
4	0.455×15	5	0.528×17	6	0.296×32
7	1.562×16	8	0.826×76	9	1.746×28
10	2.468×34	11	3.085×25	12	4.872×18

4	6.825	5	8.976	6	9.472	7	24.992	8	62.776
9	48.888	10	83.912	11	77.125	12	87.696		

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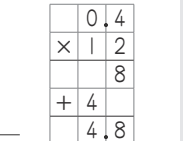
13-7 Decimal Numbers-2 Multiplication Problems

Example There are 12 cans of juice. Each can weighs 0.4 kg. What is the total weight in kg?

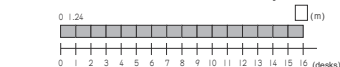


Math sentence
 $0.4 \times 12 = 4.8$

Answer 4.8 kg

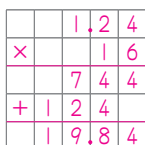


1 There are some long desks. The length of the desk is 1.24 m. If we connect 16 desks, how many m will it be from end to end?

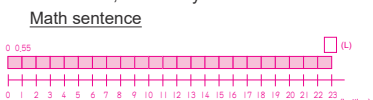


Math sentence
 $1.24 \times 16 = 19.84$

Answer 19.84 m

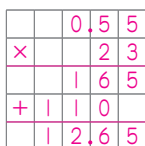


2 There are 23 empty water bottles. If we put 0.55 L of water in each bottle, how many L of water will we need in total?



Math sentence
 $0.55 \times 23 = 12.65$

Answer 12.65 L



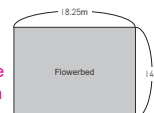
3 A rectangular flower bed is 18.25 m long and 14 m wide. How many m^2 is the flower bed?

Math sentence

Area of Rectangle = Length \times Width

$18.25 \times 14 = 255.5$

Answer 255.5 m^2



4 A gardener waters her flowerbed with 11.4 L twice a day. How much water does the gardener need in one week?

Math sentence

1 week = 7 days

How many times does the gardener water her flowerbed?
2 (times) \times 7 (days) = 24 (times)

$11.4 \times 14 = 159.6$

Answer 159.6 L



There are 7 days in a week. So, the gardener will water her flowerbed 14 times a week (2 times \times 7 days = 14 times.)

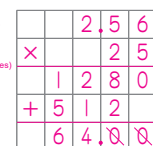
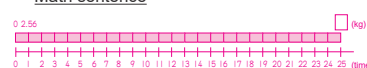


5 My class collected 2.56 kg of empty cans cleaning our neighborhood. The entire school collected 25 times that amount. How many kg did the entire school collect?

Math sentence

$2.56 \times 25 = 64$

Answer 64 kg



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13-8 Decimal Numbers-2 **Review (1)**

1 Calculate the following.

- ① 5.3×4 ② 6.7×8 ③ 1.35×5

$$\begin{array}{r} \\ \times \\ \hline \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ \times \\ \hline \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ \times \\ \hline \\ \\ \hline \end{array}$$

- ④ 2.4×34 ⑤ 6.25×47 ⑥ 7.49×45
 ⑦ 4.86×53 ⑧ 5.43×69 ⑨ 8.76×54
 ⑩ 2.176×18 ⑪ 0.925×83 ⑫ 1.692×46

④	81.6	⑤	293.75	⑥	337.05	⑦	257.58	⑧	374.67
⑨	473.04	⑩	39.168	⑪	76.775	⑫	77.832		

2 The length of a bridge is 34 times longer than a 1.55 m measuring stick. How long is the bridge?

Math sentence

$$1.55 \times 34 = 52.7$$

Answer 52.7 m

$$\begin{array}{r} \\ \times \\ \hline \\ \\ \hline \end{array}$$

3 There are 28 canned fruits, each of which weighs 0.385 kg. What is the total weight?

Math sentence

$$0.385 \times 28 = 10.78$$

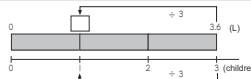
Answer 10.78 kg

$$\begin{array}{r} \\ \times \\ \hline \\ \\ \hline \end{array}$$

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13-9 Decimal Numbers-2 **Division of Decimal Numbers (1)**

Example We bought 3.6 L of tea. If we share this tea equally among 3 children, how much tea will each child get?



According to the above diagram, we can make a math sentence of $3.6 \div 3$. This division problem can be solved in the following way.

$$3.6 \div 3 = 1.2$$

↓ 10 times

$$36 \div 3 = 12$$

When the dividend is multiplied by 10, the quotient becomes 10 times of the original quotient. Therefore, the original quotient must be $\frac{1}{10}$.

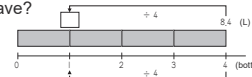
Math sentence $3.6 \div 3 = 1.2$ Answer 1.2 L

1 8.4 L of tomato juice is separated equally into 4 bottles. How many L does each bottle have?

Math sentence

$$8.4 \div 4 = 2.1$$

Answer 2.1 L

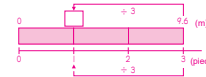


2 A 9.6 m ribbon is cut into 3 equal pieces. How long is each piece?

Math sentence

$$9.6 \div 3 = 3.2$$

Answer 3.2 m



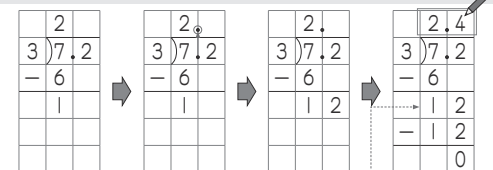
3 Calculate the following division problems.

- ① $4.8 \div 4 = 1.2$ ② $3.3 \div 3 = 1.1$ ③ $6.8 \div 2 = 3.4$
 ④ $9.6 \div 3 = 3.2$ ⑤ $8.2 \div 2 = 4.1$ ⑥ $6.9 \div 3 = 2.3$

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13-10 Decimal Numbers-2 **Division of Decimal Numbers (2)**

Example Calculate $7.2 \div 3$ by using the division algorithm.



Divide 7 in the tens place by 3. Write the quotient, 2 in the ones place. **Multiply** 3 by 2. **Subtract** 6 from 7.

Write the decimal **Bring down** the point directly above 2 from the tenths. Write the quotient, 4 in the tenths place. **Multiply** 3 by 4. **Subtract** 12 from 12.

Divide 12 by 3. Write the quotient, 4 in the tenths place. **Multiply** 3 by 4. **Subtract** 12 from 12.

12 means there are twelve 0.1's.

Calculate the following by using the division algorithm.

- ① $7.8 \div 3$ ② $8.4 \div 7$ ③ $9.6 \div 4$ ④ $5.1 \div 3$

$$\begin{array}{r} \\ 3 \overline{) 7.8} \\ \underline{- 6} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 7 \overline{) 8.4} \\ \underline{- 7} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 4 \overline{) 9.6} \\ \underline{- 8} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 3 \overline{) 5.1} \\ \underline{- 3} \\ \\ \\ \hline \end{array}$$

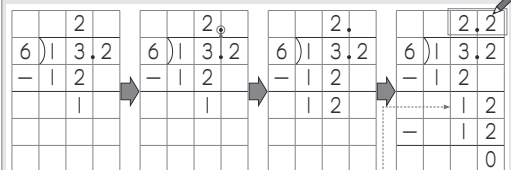
- ⑤ $8.4 \div 6$ ⑥ $9.2 \div 4$ ⑦ $8.5 \div 5$ ⑧ $9.6 \div 8$
 ⑨ $6.4 \div 4$ ⑩ $7.6 \div 2$ ⑪ $9.8 \div 7$ ⑫ $6.5 \div 5$

⑤	1.4	⑥	2.3	⑦	1.7	⑧	1.2
⑨	1.6	⑩	3.8	⑪	1.4	⑫	1.3

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13-11 Decimal Numbers-2 **Division of Decimal Numbers (3)**

Example Calculate $13.6 \div 4$ by using the division algorithm.



Divide 13 by 3. Write the quotient, 2 in the ones place. **Multiply** 6 by 2. **Subtract** 12 from 13.

Write the decimal **Bring down** the point directly above from the tenths. Write the quotient, 2 in the tenths place. **Multiply** 6 by 2. **Subtract** 12 from 12.

Divide 12 by 6. Write the quotient, 2 in the tenths place. **Multiply** 6 by 2. **Subtract** 12 from 12.

12 means there are twelve 0.1's.

Calculate the following by using the division algorithm.

- ① $15.4 \div 7$ ② $23.5 \div 5$ ③ $11.4 \div 6$ ④ $27.2 \div 4$

$$\begin{array}{r} \\ 7 \overline{) 15.4} \\ \underline{- 14} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 5 \overline{) 23.5} \\ \underline{- 20} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 6 \overline{) 11.4} \\ \underline{- 6} \\ \\ \\ \hline \end{array}$$

$$\begin{array}{r} \\ 4 \overline{) 27.2} \\ \underline{- 4} \\ \\ \\ \hline \end{array}$$

- ⑤ $68.8 \div 8$ ⑥ $19.8 \div 9$ ⑦ $26.1 \div 3$ ⑧ $19.2 \div 2$
 ⑨ $15.6 \div 6$ ⑩ $23.6 \div 4$ ⑪ $51.1 \div 7$ ⑫ $32.8 \div 8$

⑤	8.6	⑥	2.2	⑦	8.7	⑧	9.6
⑨	2.6	⑩	5.9	⑪	7.3	⑫	4.1

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13-12 Division of Decimal Numbers (4)

Example Calculate $5.4 \div 6$ by using the division algorithm.

Divide 5 by 6. Since $5 \div 6 = 0$ R 5, write a 0 in the ones place.

Write the decimal point directly above the decimal point of the dividend.

Divide 54 by 6. Write the quotient, 9, in the tenths place. Multiply 6 by 9. Subtract 54 from 54.

When the quotient with 0 in the ones place, we must write a 0.

Don't do the calculation of $54 \div 6$ first.

54 means there are fifty-four 0.1's.

Calculate the following by using the division algorithm.

1 $3.6 \div 9$ 2 $4.8 \div 8$ 3 $3.2 \div 4$ 4 $1.2 \div 3$

5 $4.5 \div 5$ 6 $3.6 \div 6$ 7 $1.8 \div 2$ 8 $2.4 \div 3$

9 $4.2 \div 7$ 10 $6.3 \div 9$ 11 $7.2 \div 8$ 12 $1.6 \div 4$

5	0.9	6	0.6	7	0.9	8	0.8
9	0.6	10	0.7	11	0.9	12	0.4

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13-13 Division of Decimal Numbers (5)

Example Calculate $78.2 \div 23$ by using the division algorithm.

Divide 78 by 23. Write the quotient, 3, in the ones place. Multiply 23 by 3. Subtract 69 from 78.

Write the decimal point directly above the decimal point of the dividend.

Bring down the 2 from the tenths place. Divide 92 by 23. Write the quotient, 4, in the tenth place. Multiply 23 by 4. Subtract 92 from 92.

92 means there are ninety-two 0.1's.

Calculate the following by using the division algorithm.

1 $86.4 \div 24$ 2 $46.8 \div 18$ 3 $54.4 \div 16$

4 $87.5 \div 25$ 5 $99.2 \div 32$ 6 $73.1 \div 43$

7 $78.2 \div 34$ 8 $67.2 \div 42$ 9 $41.6 \div 13$

10 $66.3 \div 51$ 11 $81.6 \div 17$ 12 $75.6 \div 27$

4	3.5	5	3.1	6	1.7	7	2.3	8	1.6
9	3.2	10	1.3	11	4.8	12	2.8		

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13-14 Division of Decimal Numbers (6)

Example Calculate $8.67 \div 3$ by using the division algorithm.

Divide 8 by 3. Write the quotient, 2, in the ones place. Multiply 3 by 2. Subtract 6 from 8.

Write the decimal point directly above the decimal point of the dividend.

Divide 26 by 3. Write the quotient, 8, in the tenth place. Multiply 3 by 8. Subtract 24 from 26.

Bring down the 6 from the tenths place. Multiply 3 by 9. Subtract 27 from 27.

24 means there are twenty-four 0.1's. 27 means there are twenty-seven 0.1's.

Calculate the following by using the division algorithm.

1 $6.52 \div 4$ 2 $7.56 \div 7$ 3 $7.59 \div 3$ 4 $7.86 \div 6$

5 $5.34 \div 2$ 6 $9.36 \div 4$

7 $7.95 \div 5$ 8 $3.94 \div 2$

9 $7.42 \div 7$ 10 $6.24 \div 3$

The problems 2, 9, and 10 are difficult. Can you solve them?

3	2.53	4	1.31	5	2.67	6	2.34
7	1.59	8	1.97	9	1.06	10	2.08

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13-15 Division of Decimal Numbers (7)

Example Calculate $9.826 \div 34$ by using the division algorithm.

Divide 9 by 34. Since $9 \div 34 = 0$ R 9, write the quotient, 0 in the ones place. Write the quotient, 2, in the tenths place. Multiply 34 by 2. Subtract 68 from 98.

Bring down the 2 from the tenths place. Divide 302 by 34. Write the quotient, 8, in the hundredth place. Multiply 34 by 8. Subtract 272 from 302.

Bring down the 6 from the hundredths place. Divide 306 by 34. Write the quotient, 9, in the thousandth place. Multiply 34 by 9. Subtract 306 from 306.

68 means there are sixty-eight 0.1's. 272 means there are two hundred seventy-two 0.01's. 306 means there are three hundred six 0.001's.

Calculate the following by using the division algorithm.

1 $6.399 \div 27$ 2 $5.859 \div 31$ 3 $5.805 \div 43$ 4 $8.528 \div 52$

5 $8.211 \div 23$ 6 $7.686 \div 61$

7 $7.488 \div 36$ 8 $5.712 \div 56$

9 $3.268 \div 76$ 10 $2.747 \div 41$

3	0.135	4	0.164	5	0.357	6	0.126
7	0.208	8	0.102	9	0.043	10	0.067

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13-16 Decimal Numbers-2
Division of Decimal Numbers (8)

Example Calculate $46.7 \div 3$ by using the division algorithm. Calculate the quotient to the ones place, and find the remainder.

Divide 4 by 3. Write the quotient, 1, in the tens place. Multiply 3 by 1. Subtract 3 from 4.

Bring down the 6 from the ones place. Divide 16 by 3. Write the quotient, 5, in the ones place. Multiply 3 by 5. Subtract 15 from 16.

Bring down the 7 from the tenths place. Write the decimal point of the remainder. The decimal point goes in the same place as the decimal point of the dividend. Multiply 3 by 5. Subtract 15 from 16.

Check the answer:
 $46.7 \div 3 = 15 \text{ R } 1.7$
 $3 \div 15 = 1.7 \text{ R } 46.7$
 $46.7 \div 3 = 15 \text{ R } 1.7$

Calculate the quotient to the ones place and find the remainder. Then check your answer.

1 $97.4 \div 7 = 13 \text{ R } 6.4$ 2 $89.5 \div 8 = 11 \text{ R } 1.5$ 3 $45.2 \div 12 = 3 \text{ R } 9.2$ 4 $74.8 \div 26 = 2 \text{ R } 22.8$

Check $7 \times 13 + 6.4 = 97.4$ Check $8 \times 11 + 1.5 = 89.5$ Check $12 \times 3 + 9.2 = 45.2$ Check $26 \times 2 + 22.8 = 74.8$

13-17 Decimal Numbers-2
Division of Decimal Numbers (9)

Example Continue dividing $1.7 \div 5$ until it is divided completely.

Divide 1 by 5. Since $1 \div 5 = 0 \text{ R } 1$, write 0 in the ones place. Write the decimal point directly above the decimal point of the dividend.

Divide 17 by 5. Write the quotient, 3, in the tenths place. Multiply 5 by 3. Subtract 15 from 17.

Divide 20 by 5. Write the quotient, 4, in the hundredth place. Multiply 5 by 4. Subtract 20 from 20.

Since 1.7 is the same as 1.70, bring down 0 from the hundredths place. When we continue dividing a division problem until it is divided completely, we can put 0's in the dividend.

Calculate the following division problems until these are divided completely.

1 $7.4 \div 5 = 1.48$ 2 $1.38 \div 4 = 0.345$ 3 $1.71 \div 6 = 0.285$ 4 $16.31 \div 35 = 0.466$ 5 $16.47 \div 54 = 0.305$ 6 $34.34 \div 68 = 0.505$

7 $84.5 \div 26 = 3.25$ 8 $36.9 \div 18 = 2.05$ 9 $9 \div 75 = 0.12$ 10 $3 \div 25 = 0.12$

To solve the problems 9 and 10, we must put two 0's like "9.00" and "3.00" respectively.

13-18 Decimal Numbers-2
Rounding the Quotients

Example There is a ribbon that is 7 m long. If we share this ribbon equally among 3 children, how many m of ribbon can each child get? Round the answer to a tenths of a metre.

Math sentence $7 \div 3 = 2.3\bar{3}$

Answer Approximately 2.3 m

The answer is 2.66... So, we round this number to the tenths place. The answer is 2.7.

1 There is 7.3 L of orange juice. If we share it equally among 6 people, how much juice does each person get? Round the answer to a tenth of a L.

Math sentence $7.3 \div 6 = 1.2\bar{1}$

Answer Approximately 1.2 L

2 Calculate the following. Round the quotient to the tenths place.

1 $24.3 \div 7 \approx 3.5$ 2 $61.7 \div 43 \approx 1.4$ 3 $95.5 \div 37 \approx 2.6$ 4 $54.5 \div 19 \approx 2.9$

13-19 Decimal Numbers-2
Division Problems

Example We have 50.4 kg of sugar. If we divide it into 14 small packages, how much will each small package weigh?

Math sentence $50.4 \div 14 = 3.6$

Answer 3.6 kg

1 We have 6.6 kg of rice. We divide the rice equally into 12 bags. What will the weight be of each bag of rice?

Math sentence $6.6 \div 12 = 0.55$ Answer 0.55 kg

2 We have 46.5 m of ribbon. If we cut 4 m long pieces from this ribbon, how many pieces can we get? How long is the remaining piece of ribbon?

Math sentence $46.5 \div 4 = 11 \text{ R } 2.5$

Answer We can get 11 pieces and 2.5 m of ribbon will be left over.

13-20 Decimal Numbers-2
Times as Many and Decimal Numbers

Example I have a red tape and a blue tape. The red tape is 5 m long and the blue tape is 8 m long. How many times longer is the blue tape than the red tape?

Math sentence $8 \div 5 = 1.6$
Answer 1.6 times

Think about the following way:
Type A: 5m (1 unit), 10m (2 times)
Type B: 5m (1 unit), 10m (2 times)
Type C: 5m (1 unit), 10m (2 times)

1 I have 5 chocolates. My friend has 10 chocolates. How many times more chocolate does my friends have compared to me?

Math sentence

$10 \div 5 = 2$

Answer 2 times

2 I have 5 chocolates. Another friend of mine has 7 chocolates. How many times more chocolate does my friends have compared to me?

Math sentence

$7 \div 5 = 1.4$

Answer 1.4 times

3 I have 5 chocolates. My brother has 5 chocolates. How many times more chocolates does my friends have compared to me?

Math sentence

$5 \div 5 = 1$

Answer same

4 I have 5 chocolates. My sister has 2 chocolates. How many times more chocolates does my sister have compared to me?

Math sentence

$2 \div 5 = 0.4$

Answer 0.4 times

13-21 Decimal Numbers-2
Review (2)

1 Calculate the following division problems by using the division algorithm.

1 $11.4 \div 6$ 2 $12.8 \div 4$ 3 $0.8 \div 4$ 4 $7.2 \div 9$

5 $90.1 \div 17$ 6 $39.9 \div 21$ 7 $98.7 \div 47$ 8 $89.6 \div 28$
9 $9.63 \div 45$ 10 $54.99 \div 13$ 11 $0.133 \div 7$ 12 $1.664 \div 8$

1	1.9	2	3.2	3	0.2	4	0.8
5	5.3	6	1.9	7	2.1	8	3.2
9	0.214	10	4.23	11	0.019	12	0.208

2 There is 21.5 L of lemonade. If we share it equally among 9 children, how many L can each child get? Round the answer to the nearest tenth of a L.

Math sentence

$21.5 \div 9 = 2.38$ Answer Approximately 2.4 L

3 I bought 8 new books. My older sister bought 12 new books. How many times more books did my sister buy compared to me?

Math sentence

$12 \div 8 = 1.5$ Answer 1.5 times

4 I have 19.5 L of ice tea. If we share it equally among 15 people, how much ice tea does each person get?

Math sentence

$19.5 \div 15 = 1.3$ Answer 1.3 L

14-1 Solid Shapes
Cuboids and Cubes (1)

Instruction Cuboid and Cube

Flat figures are called **plane shapes**. Objects that occupy space are called **solid shapes**. Their surfaces are called **faces**.

- A solid shape whose faces are only rectangles or squares is called a "cuboid".
- A solid shape whose faces are only squares is called a "cube".

Example The figures below are a cuboid and a cube.

Side is for plane shapes and edge is for solid shapes.

1 Fill in the following table by observing a cuboid and a cube.

	Number of faces	Number of edges	Number of vertices
Cuboid	6	12	8
Cube	6	12	8

2 How many pairs of faces are the same in a cuboid and a cube?
Cuboid 3 Cube All the faces are the same.

3 How many sets of edges are the same length in a cuboid and a cube?
Cuboid 3 Cube All the edges are of equal length.

With the cuboid and the cube on the right, answer the following questions.

- 1 How many faces are there?
Cuboid 6 Cube 6
- 2 How many vertexes are there?
Cuboid 8 Cube 8
- 3 How many kinds of edge lengths are there?
Cuboid 3 Cube 1
-

14-2 Solid Shapes
Cuboids and Cubes (2)

Example The figure on the right shows a cuboid.

1 Which edges are perpendicular to edge AB?
AE, BF, AD, and BC (EA, FB, DA, and CB)

2 Which edges are parallel to edge AE?
BF, DH, and CG (FB, HD, and GC)

3 Which faces are parallel to face a?
c

The figure on the right shows a cube. Answer the following questions.

1 Which edges are perpendicular to edge CG?
BC, FG, HG, and DC (CB, GF, GH, and CD)

2 Which edges are parallel to edge EF?
AB, HG, and DC (BA, GH, and CD)

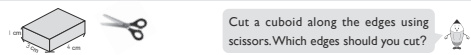
3 Which faces are parallel to face c?
d

4 Which edges are perpendicular to face a?
AE, BF, DH, and CG (EA, FB, HD, and GC)

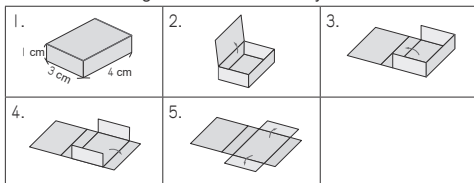
5 Which edges are parallel to face d?
AE, AD, DH, and EH (EA, DA, HD, and HE)

14-3 Solid Shapes Nets (1)

Instruction Disassemble the following cuboid into one figure to investigate how it is made.

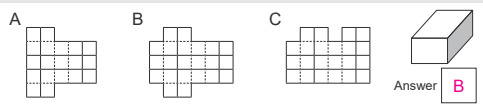


Cut a cuboid along the edges using scissors. Which edges should you cut?
Cut the coloured edges and unfold it one by one as follows:

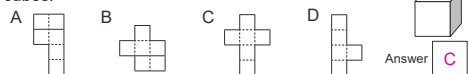


A figure drawn on a sheet of paper by cutting the edges of a box, unfolding it and laying it flat is called a **net**.
You can also make different shapes depending on how you cut it.

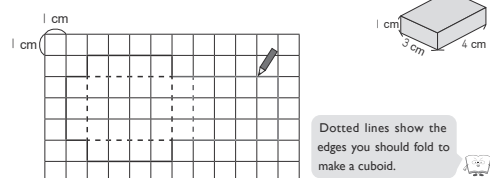
Example Which net can form a cuboid? Fold the dotted lines and make cuboids.



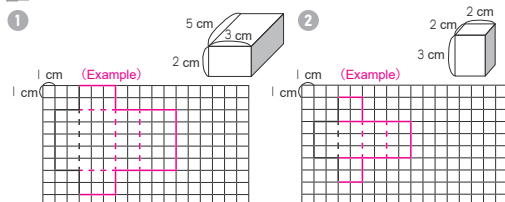
1 Which net can form a cube? Fold the dotted lines and make cubes.



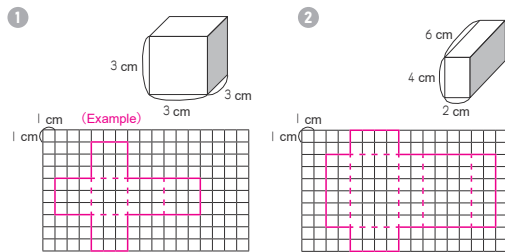
Example 2 Finish drawing the net of the cuboid on the right.



1 Finish drawing the net of the cuboid on the right.

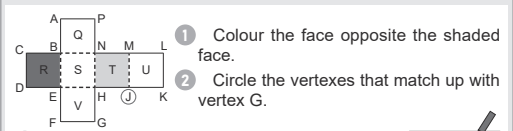


2 Draw a net of this cube on graph paper.



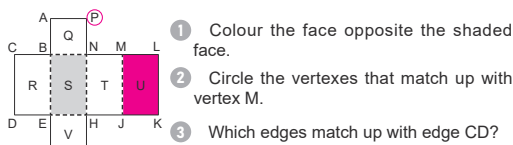
14-4 Solid Shapes Nets (2)

Example We are going to make a cube by folding the net below.

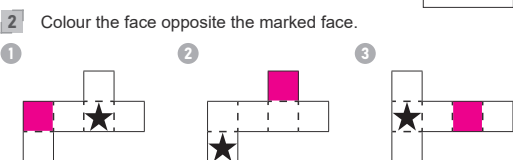


3 Which edges match up with edge AP? Answer: ML (LM)
4 Which faces are perpendicular to edge EH? Answer: R, T

1 We are going to make a cuboid by folding the net below.

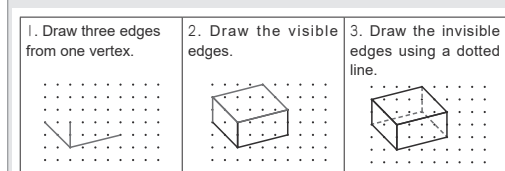


4 Which faces are perpendicular to edge HN? Answer: LK (KL)
Answer: Q, V



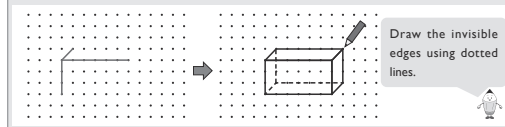
14-5 Solid Shapes Sketch

Instruction How to draw a figure that shows the full shape of a cuboid.

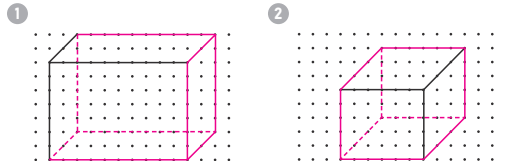


A diagram that shows a quick view of the whole object is called a **sketch**.
In a sketch, we draw parallel edges as parallel lines.
When drawing a figure, you can also draw the front face.

Example Finish drawing the sketch of the cuboid as shown below.

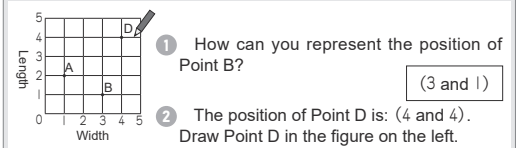


Finish drawing the sketch of the cuboid as shown below.

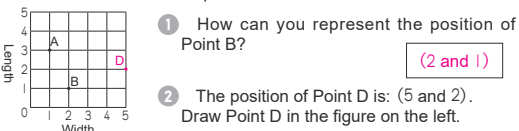


14-6 Solid Shapes **How to Express Position (1)**

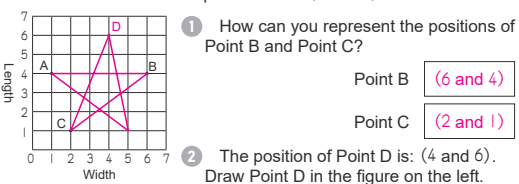
Example On the grid paper shown below, the length and width axes are numbered. Point A is represented as (1 and 2).



1 On the grid paper shown below, the length and width axes are numbered. Point A is represented as (1 and 3).



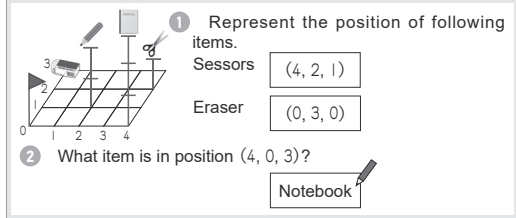
2 On the grid paper shown below, the length and width axes are numbered. Point A is represented as (1 and 4).



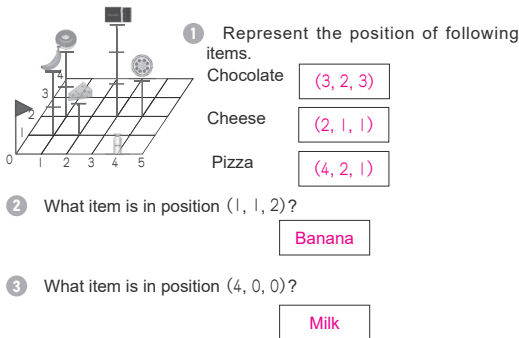
3 Draw the following points in order and connect them with lines. Point A (1 and 4) → Point B → Point C → Point D (4 and 6) → (5 and 1) → Point A

14-7 Solid Shapes **How to Express Position (2)**

Example Every position in the space is represented by three numbers. The position of the pen is 2 width, 1 length, and 2 height. We express the position as (2, 1, 2).

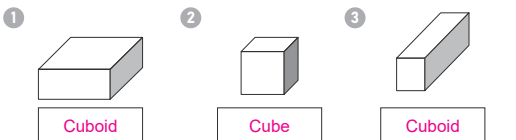


The position of the doughnut is 1 width, 2 length, and 2 height. We express the position as (1, 2, 2).

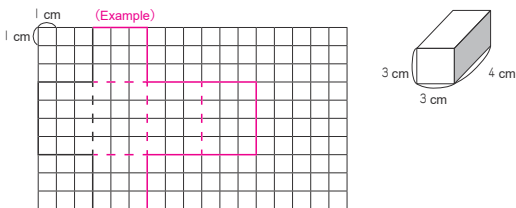


14-8 Solid Shapes **Review**

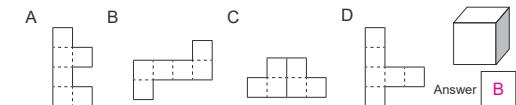
1 Fill in the blank with the name of the figures.



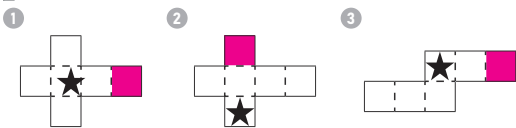
2 Finish drawing the net of the cuboid on the right.



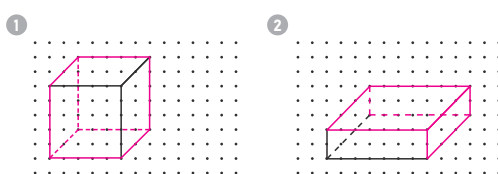
3 Which net can form a cube? Fold the dotted lines and make cubes.



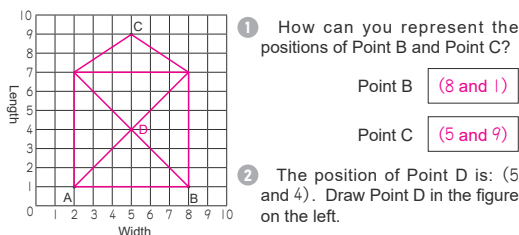
4 Colour the face opposite of the marked face.



5 Finish drawing the sketch of the cube as shown below.

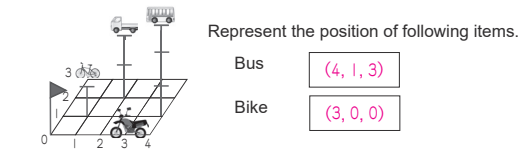


6 On the grid paper, the length and width axes are numbered. Point A is represented as (2 and 1).



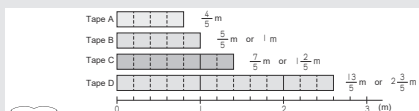
3 Draw the following points in order and connect them with lines. Point A (2 and 1) → Point B → (8 and 7) → Point C → (2 and 7) → Point A → (8 and 7) → (2 and 7) → Point B

7 The position of the bicycle is 1 width, 1 length, and 1 height. We express the position as (2, 1, 2).



15-1 Fractions Expressing Fractions (1)

Instruction Four pieces of tape are shown below. How many metres long is each piece?



The small tick indicates $\frac{1}{5}$ m.

Fractions where the numerator is less than the denominator, such as $\frac{4}{5}$ called **proper fractions**.

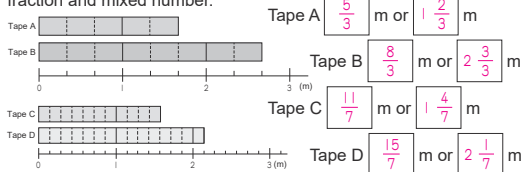
Fractions where the numerator is equal to or greater than the denominator such as $\frac{5}{5}$, $\frac{7}{5}$ and $\frac{13}{5}$ are called **improper fractions**.

Fractions expressed as a combination of a whole number and a proper fraction such as $1\frac{2}{5}$ and $2\frac{3}{5}$ are called **mixed numbers**. $1\frac{2}{5}$ is read as "one and two fifths."

Example Write down the length of the tape as an improper fraction and as a mixed number.

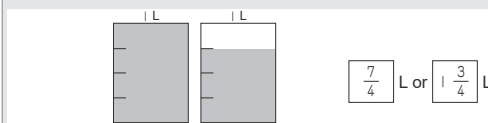


Show the length of the following tapes by using both the improper fraction and mixed number.

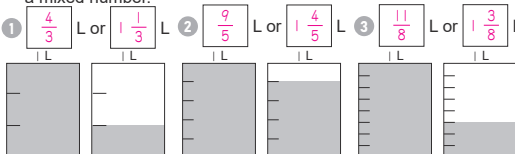


15-2 Fractions Expressing Fractions (2)

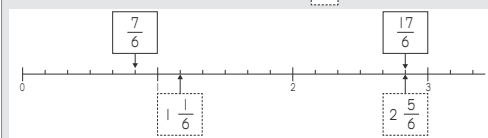
Example 1 Write the total amount of water as an improper fraction and as a mixed number.



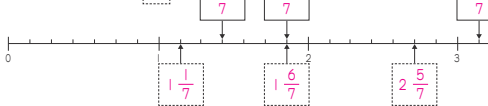
1 Write the total amount of water as an improper fraction and as a mixed number.



Example 2 Write the appropriate improper fraction in the and mixed number in the .

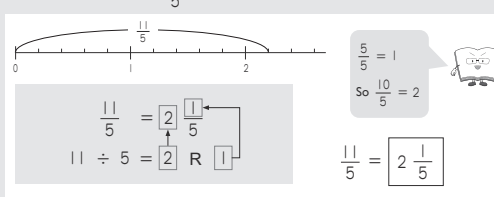


2 Write the appropriate improper fractions in the , and mixed numbers in the .

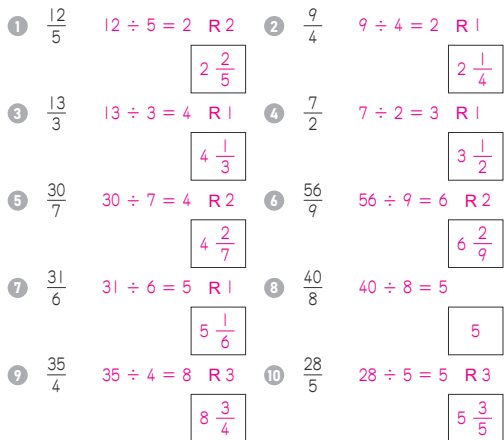


15-3 Fractions Expressing Fractions (3)

Example Change $\frac{11}{5}$ into a mixed number.

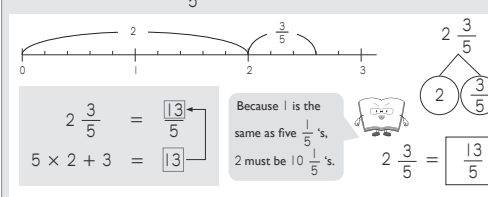


Change the following improper fractions into mixed numbers or whole numbers.

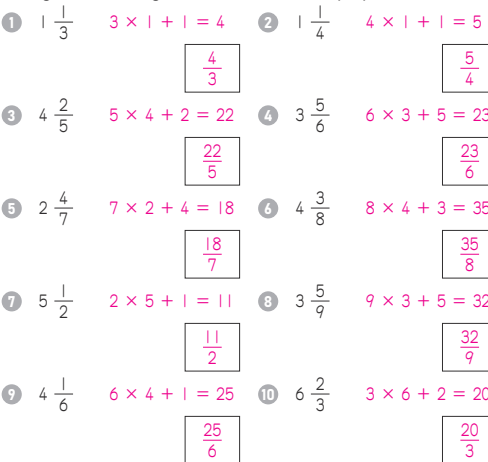


15-4 Fractions Expressing Fractions (4)

Example Change $2\frac{3}{5}$ into an improper fraction.



Change the following mixed numbers into improper fractions.



15-5 Fractions Comparing the Size of Numbers (1)

Example Use an inequality symbol (< or >) to express the relationship between the two numbers.

$$\frac{25}{7} < 3\frac{5}{7}$$

Compare them as mixed numbers:
 $\frac{25}{7} = 3\frac{4}{7}$
 $25 \div 7 = 3 \text{ R } 4$

Therefore, this problem is...
 $3\frac{4}{7} < 3\frac{5}{7}$

Compare them as improper fractions:
 $3\frac{5}{7} = \frac{26}{7}$
 $7 \times 3 + 5 = 26$

Therefore, this problem is...
 $\frac{25}{7} < \frac{26}{7}$

It is easier to compare the two numbers if they are both mixed numbers or both improper fractions.

Use an inequality symbol (< or >) to express the relationship between the two numbers.

- | | |
|---------------------------------|----------------------------------|
| 1 $\frac{8}{3} > 2\frac{1}{3}$ | 2 $\frac{23}{4} > 5\frac{1}{4}$ |
| 3 $\frac{23}{7} < 3\frac{3}{7}$ | 4 $\frac{30}{6} > 4\frac{5}{6}$ |
| 4 $\frac{16}{5} < 3\frac{2}{5}$ | 6 $\frac{22}{9} > 2\frac{2}{9}$ |
| 7 $\frac{27}{8} > 3\frac{1}{8}$ | 8 $\frac{26}{3} < 9\frac{1}{3}$ |
| 9 $\frac{15}{2} > 6\frac{1}{2}$ | 10 $\frac{45}{7} < 6\frac{4}{7}$ |

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15-6 Fractions Comparing the Size of Numbers (2)

Example Put the numbers in the () in order from the largest to smallest.

$$\left(\frac{7}{8}, 2\frac{3}{8}, \frac{15}{8} \right)$$

Compare them as improper fractions:
 $2\frac{3}{8} = \frac{19}{8}$
 $8 \times 2 + 3 = 19$

Answer: $2\frac{3}{8} \rightarrow \frac{15}{8} \rightarrow \frac{7}{8}$

It is easier to compare the three numbers if they are all mixed numbers or all improper fractions.

Put the numbers in the () in order from the largest to smallest.

- 1 $\left(\frac{12}{5}, 2\frac{1}{5}, \frac{9}{5} \right)$ Answer: $\frac{12}{5} \rightarrow 2\frac{1}{5} \rightarrow \frac{9}{5}$
- 2 $\left(\frac{20}{7}, 3, 2\frac{5}{7} \right)$ Answer: $3 \rightarrow \frac{20}{7} \rightarrow 2\frac{5}{7}$
- 3 $\left(\frac{25}{6}, 3\frac{5}{6}, 4 \right)$ Answer: $\frac{25}{6} \rightarrow 4 \rightarrow 3\frac{5}{6}$
- 4 $\left(7\frac{1}{4}, \frac{31}{4}, 7, 6\frac{3}{4} \right)$ Answer: $\frac{31}{4} \rightarrow 7\frac{1}{4} \rightarrow 7 \rightarrow 6\frac{3}{4}$
- 5 $\left(\frac{70}{9}, 8\frac{8}{9}, \frac{68}{9}, 8 \right)$ Answer: $8\frac{8}{9} \rightarrow 8 \rightarrow \frac{70}{9} \rightarrow \frac{68}{9}$

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15-7 Fractions Fractions of Equal Size

Example Look at the number line below and find two fractions that are exactly equal in size to $\frac{1}{3}$.

In which two number lines does the blue line land on a tick mark? Now what is the fraction for that tick mark?

Answer: $\frac{2}{6}$ and $\frac{3}{9}$

Look at the number line above and answer the following questions.

- 1 Find the fractions that are equal in size to $\frac{1}{4}$. $\frac{2}{8}$
- 2 Find four fractions that are equal in size to $\frac{1}{2}$. $\frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$
- 3 Find the fractions that are equal in size to $\frac{2}{3}$. $\frac{4}{6}, \frac{6}{9}$
- 4 Which is greater, $\frac{1}{6}$ or $\frac{1}{7}$? $\frac{1}{6}$
- 5 Which is greater, $\frac{3}{5}$ or $\frac{5}{9}$? $\frac{3}{5}$

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15-8 Fractions Addition of Fractions (1)

Example My mother made milk tea by mixing $\frac{4}{5}$ L of milk and $\frac{3}{5}$ L of black tea. How many litres of milk tea did she make?

Milk: Four $\frac{1}{5}$'s
 Black Tea: Three $\frac{1}{5}$'s
 Altogether: Seven $\frac{1}{5}$'s

Math sentence: $\frac{4}{5} + \frac{3}{5} = \frac{7}{5}$

When proper fractions have the same denominator, add the numerators only.

Answer: $\frac{7}{5}$ L or $1\frac{2}{5}$ L

It is fine that the answer will be either improper fraction or mixed number.

- 1 I have two pieces of tape. One is $\frac{4}{7}$ m long and the other is $\frac{6}{7}$ m long. How long is the total length of both pieces together?

Math sentence: $\frac{4}{7} + \frac{6}{7} = \frac{10}{7}$
 Answer: $\frac{10}{7}$ m or $1\frac{3}{7}$ m

- 2 Calculate the following addition problems.
- 1 $\frac{2}{3} + \frac{2}{3} = \frac{4}{3}$ or $1\frac{1}{3}$
- 2 $\frac{5}{7} + \frac{6}{7} = \frac{11}{7}$ or $1\frac{4}{7}$
- 3 $\frac{11}{5} + \frac{3}{5} = \frac{14}{5}$ or $2\frac{4}{5}$
- 4 $\frac{7}{4} + \frac{5}{4} = \frac{12}{4}$ or 3
- 5 $\frac{14}{9} + \frac{3}{9} = \frac{17}{9}$ or $1\frac{8}{9}$
- 6 $\frac{15}{6} + \frac{5}{6} = \frac{20}{6}, \frac{10}{3}$ or $3\frac{2}{3}$

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15-9 Fractions Addition of Fractions (2)

Example 1 Calculate $2\frac{1}{5} + 1\frac{3}{5}$

Calculate the whole number parts and the fraction parts separately.

It is also fine to change the mixed number to an improper fraction and to calculate.

$$2\frac{1}{5} + 1\frac{3}{5} = \frac{11}{5} + \frac{8}{5} = \frac{19}{5} = 3\frac{4}{5}$$

- 1** Calculate the following addition problems.
- ① $2\frac{2}{5} + 4\frac{1}{5} = 6\frac{3}{5}$ or $28\frac{3}{5}$ ② $1\frac{1}{7} + 2\frac{4}{7} = 3\frac{5}{7}$ or $26\frac{5}{7}$ ③ $4\frac{1}{9} + 2\frac{7}{9} = 6\frac{8}{9}$ or $62\frac{8}{9}$

Example 2 Calculate $2\frac{2}{5} + \frac{4}{5}$

Calculate the whole number parts and then write the fraction part.

As same as Example 1, it is also fine to change the mixed number to an improper fraction and to calculate.

$$2\frac{2}{5} + \frac{4}{5} = \frac{12}{5} + \frac{4}{5} = \frac{16}{5} = 3\frac{1}{5}$$

- 2** Calculate the following addition problems.
- ① $3\frac{4}{5} + \frac{3}{5} = 4\frac{2}{5}$ or $22\frac{2}{5}$ ② $1\frac{3}{7} + \frac{5}{7} = 2\frac{1}{7}$ or $15\frac{1}{7}$ ③ $\frac{7}{9} + 2\frac{4}{9} = 3\frac{2}{9}$ or $29\frac{2}{9}$

Example 3 Calculate $3 + 1\frac{2}{5}$

Calculate the whole number parts and the fraction parts separately.

It is also fine to change both whole number and mixed number to improper fractions and to calculate.

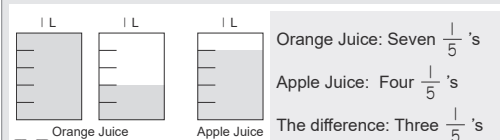
$$3 + 1\frac{2}{5} = \frac{15}{5} + \frac{7}{5} = \frac{22}{5} = 4\frac{2}{5}$$

- 3** Calculate the following addition problems.
- ① $2 + 3\frac{1}{2} = 5\frac{1}{2}$ or $11\frac{1}{2}$ ② $1 + 2\frac{3}{5} = 3\frac{3}{5}$ or $18\frac{3}{5}$ ③ $\frac{5}{8} + 3 = 4\frac{5}{8}$ or $37\frac{5}{8}$

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15-10 Fractions Subtraction of Fractions (1)

Example My mother made $\frac{7}{5}$ L of orange juice and $\frac{4}{5}$ L of apple juice. How many more L of orange juice did she make?



Math sentence $\frac{7}{5} - \frac{4}{5} = \frac{4}{5}$

When the denominators of both fractions have the same number, subtract the numerators.

Answer $\frac{4}{5}$ L

- 1** I have a $\frac{11}{7}$ m red tape and $\frac{6}{7}$ m white tape. How many more metres of red tape do I have?

Math sentence $\frac{11}{7} - \frac{6}{7} = \frac{5}{7}$ **Answer** $\frac{5}{7}$ m

- 2** Calculate the following subtraction problems.
- ① $\frac{10}{7} - \frac{4}{7} = \frac{6}{7}$ ② $\frac{11}{3} - \frac{4}{3} = \frac{7}{3}$ or $2\frac{1}{3}$
- ③ $\frac{13}{9} - \frac{8}{9} = \frac{5}{9}$ ④ $\frac{9}{7} - \frac{5}{7} = \frac{4}{7}$
- ⑤ $\frac{14}{5} - \frac{7}{5} = \frac{7}{5}$ or $1\frac{2}{5}$ ⑥ $\frac{10}{9} - \frac{5}{9} = \frac{5}{9}$
- ⑦ $\frac{8}{3} - \frac{4}{3} = \frac{4}{3}$ or $1\frac{1}{3}$ ⑧ $\frac{7}{5} - \frac{4}{5} = \frac{3}{5}$

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15-11 Fractions Subtraction of Fractions (2)

Example 1 Calculate $3\frac{4}{5} - 1\frac{3}{5}$

Calculate the whole number parts and the fraction parts separately.

It is also correct to change the mixed number to an improper fraction and to calculate.

$$3\frac{4}{5} - 1\frac{3}{5} = \frac{19}{5} - \frac{8}{5} = \frac{11}{5} = 2\frac{1}{5}$$

- 1** Calculate the following subtraction problems.
- ① $4\frac{4}{7} - 1\frac{1}{7} = 3\frac{3}{7}$ or $24\frac{3}{7}$ ② $6\frac{3}{5} - 4\frac{2}{5} = 2\frac{1}{5}$ or $11\frac{1}{5}$ ③ $5\frac{2}{3} - 4\frac{1}{3} = 1\frac{1}{3}$ or $4\frac{1}{3}$

Example 2 Calculate $2\frac{1}{5} - \frac{4}{5}$

Make the fractional part of the mixed number an improper fraction by regrouping and then calculate.

It is also fine to change the mixed number to an improper fraction and to calculate.

$$2\frac{1}{5} - \frac{4}{5} = 1\frac{6}{5} - \frac{4}{5} = 1\frac{2}{5}$$

- 2** Calculate the following subtraction problems.
- ① $2\frac{2}{5} - \frac{4}{5} = 1\frac{3}{5}$ or $8\frac{3}{5}$ ② $2\frac{1}{3} - \frac{2}{3} = 1\frac{2}{3}$ or $5\frac{2}{3}$ ③ $3\frac{2}{7} - 1\frac{6}{7} = 1\frac{3}{7}$ or $10\frac{3}{7}$

Example 3 Calculate $2 - \frac{1}{3}$

Change the whole number to the fraction and then calculate it.

It is also fine to change the mixed number completely and to calculate.

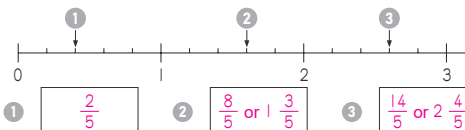
$$2 - \frac{1}{3} = \frac{6}{3} - \frac{1}{3} = \frac{5}{3} = 1\frac{2}{3}$$

- 3** Calculate the following subtraction problems.
- ① $2 - \frac{4}{5} = 1\frac{1}{5}$ or $6\frac{1}{5}$ ② $3 - \frac{2}{7} = 2\frac{5}{7}$ or $19\frac{5}{7}$ ③ $5 - 2\frac{3}{10} = 2\frac{7}{10}$ or $27\frac{7}{10}$

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15-12 Fractions Review

- 1** What fractions are represented by the tick marks labeled ①, ② and ③? If the fraction is greater than 1, express it as an improper fraction and as a mixed number.



- 2** Write the fractions in the () in order from the largest to smallest.

- ① $(\frac{13}{5}, 3\frac{2}{5}, \frac{11}{5})$ **Answer** $3\frac{2}{5} \rightarrow \frac{13}{5} \rightarrow \frac{11}{5}$
- ② $(2\frac{5}{9}, \frac{28}{9}, 3\frac{3}{9})$ **Answer** $3\frac{3}{9} \rightarrow \frac{28}{9} \rightarrow 2\frac{5}{9}$
- ③ $(\frac{22}{7}, 3\frac{3}{7}, 3)$ **Answer** $3\frac{3}{7} \rightarrow \frac{22}{7} \rightarrow 3$

- 3** Calculate the following problems. It is fine that the answer will be either improper fraction or mixed number.

- ① $\frac{2}{5} + \frac{4}{5}$ ② $1\frac{2}{9} + 3\frac{5}{9}$ ③ $1\frac{7}{9} + 3\frac{4}{9}$ ④ $1\frac{2}{3} + \frac{2}{3}$
- ⑤ $2 + \frac{5}{6}$ ⑥ $\frac{6}{7} - \frac{5}{7}$ ⑦ $5\frac{4}{5} - 3\frac{3}{5}$ ⑧ $7\frac{1}{3} - 5\frac{2}{3}$
- ⑨ $4\frac{3}{5} - \frac{4}{5}$ ⑩ $3\frac{5}{9} - \frac{7}{9}$ ⑪ $2 - \frac{7}{8}$ ⑫ $3 - 1\frac{4}{9}$

① $\frac{6}{5}$ or $1\frac{1}{5}$	② $4\frac{7}{9}$ or $43\frac{7}{9}$	③ $5\frac{2}{9}$ or $47\frac{2}{9}$	④ $2\frac{1}{3}$ or $\frac{7}{3}$
⑤ $2\frac{5}{6}$ or $17\frac{5}{6}$	⑥ $\frac{1}{7}$	⑦ $2\frac{1}{5}$ or $11\frac{1}{5}$	⑧ $1\frac{2}{3}$ or $\frac{5}{3}$
⑨ $3\frac{4}{5}$ or $19\frac{4}{5}$	⑩ $2\frac{7}{9}$ or $25\frac{7}{9}$	⑪ $1\frac{1}{8}$ or $\frac{9}{8}$	⑫ $1\frac{5}{9}$ or $14\frac{5}{9}$

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Number & Operation

Entire Grade-4 Review (1)

1 Fill in the table and write the number out in words.

	Hundred Billions	Ten Billions	One Billion	Hundred Millions	Ten Millions	One Million	Hundred Thousands	Ten Thousands	One Thousand	Hundred Tens	Tens	Ones
1 3172586000		3	1	7	2	5	8	6	0	0	0	0
Three billion, one hundred seventy-two million, five hundred eighty-six thousand.												
2 2063012000	2	0	6	3	0	1	2	0	0	0	0	0
Twenty billion, six hundred thirty million, one hundred twenty thousand.												

2 Answer the following questions.

- 1 What is 350 million times 10? **3 billion 500 million (3500000000)**
- 2 What is 80 million times 100? **8 billion (8000000000)**
- 3 What is 2 million times $\frac{1}{10}$? **200 thousand (200000)**

3 Round the following numbers to the indicated places.

- 1 14576 (ten thousand place) **10000**
- 2 7085731 (one thousand place) **7086000**
- 3 92860746 (hundred thousand place) **92900000**

4 Estimate the answers of the following as rounded numbers and then choose the correct answers from (a) to (e).

- 1 613×48 2 $21462 \div 73$ 1 (d) 2 (b)
- (a) 29, (b) 294, (c) 2942, (d) 29424, (e) 294249

5 Calculate the following division problems by using the algorithm.

- 1 $78 \div 6$ 2 $324 \div 9$ 3 $504 \div 6$ 4 $84 \div 28$ 5 $432 \div 36$
- 1 13 2 36 3 84 4 3 5 12

6 Calculate the following problems by using the algorithm. Calculate the quotient to the ones place and find the remainder.

- 1 $84 \div 5$ 2 $235 \div 7$ 3 $596 \div 52$ 4 $708 \div 24$ 5 $425 \div 73$
- 1 16 R 4 2 33 R 4 3 11 R 24 4 29 R 12 5 5 R 60

7 Calculate the following problems by using the algorithm.

- 1 $5.27 + 4.83$ 2 $0.289 + 0.052$ 3 $9.24 - 8.34$ 4 $5 - 0.124$
- 5 3.8×6 6 0.142×35 7 $20.3 \div 7$ 8 $24.6 \div 12$
- 1 10.1 2 0.341 3 0.9 4 4.876
- 5 22.8 6 4.97 7 2.9 8 2.05

8 Change the following mixed numbers into improper fractions, improper fractions into mixed numbers or whole numbers.

- 1 $2\frac{3}{7}$ 2 $1\frac{2}{11}$ 3 $\frac{43}{6}$ 4 $\frac{23}{4}$ 5 $\frac{72}{8}$
- 1 $\frac{17}{7}$ 2 $\frac{13}{11}$ 3 $7\frac{1}{6}$ 4 $5\frac{3}{4}$ 5 9

9 Calculate the following problems.

- 1 $\frac{8}{7} + \frac{5}{7}$ 2 $3\frac{5}{8} + 2\frac{4}{8}$ 3 $\frac{7}{9} - \frac{5}{9}$ 4 $6 - 4\frac{4}{5}$
- 1 $\frac{13}{7}$ or $1\frac{6}{7}$ 2 $6\frac{1}{8}$ or $\frac{49}{8}$ 3 $\frac{2}{9}$ 4 $1\frac{1}{5}$ or $\frac{6}{5}$

10 Answer the following questions.

- 1 There are 168 sheets of paper. If 26 sheets are given to each student, how many students will get paper and how many sheets of paper will be left over?

Math sentence **$168 \div 26 = 6 \text{ R } 12$** Answer **6 students will get paper and 12 sheets will be left over.**

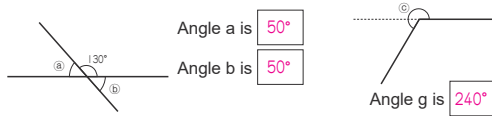
- 2 There are 12 packages, each of which weighs 3.8 kg. What is the total weight of all packages?

Math sentence **$3.8 \times 12 = 45.6$** Answer **45.6 kg**

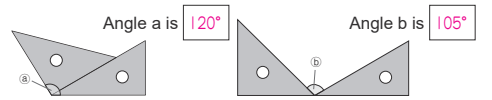
Geometry

Entire Grade-4 Review (2)

1 Measure the following angles with a protractor.



2 Two different set squares are used to make angles as follows. Find the size of each marked angle.



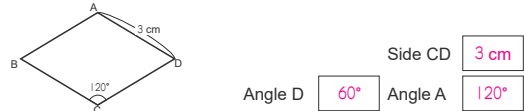
3 Which of the lines shown in the figure below are the following?

- 1 Pair of perpendicular lines **Perpendicular B and D**
- 2 Pair of parallel lines **Parallel A and C**

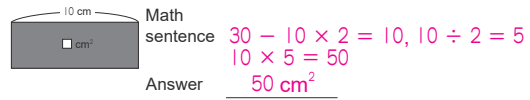
4 Find the following lengths and angles.

- 1 Parallelogram
-
- Side AD **3 cm** Side CD **2.5 cm**
- Angle A **115°** Angle D **65°**

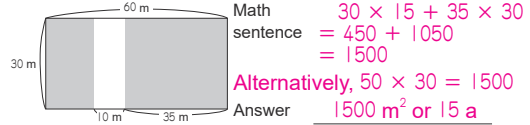
2 Rhombus



5 We are making a rectangle with a length of 10 cm by bending a 30 cm wire. What is the area of the rectangle in cm^2 ?

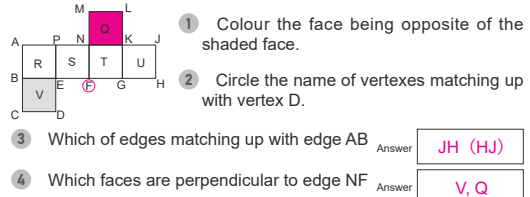


6 In the following rectangular field, the width of the path is 10 m. How many a is the area of the field?



You can calculate the area separately. Alternatively, you can move the paths and consider the area.

7 We are going to make a cube by folding the net below.



Change & Relation

Entire Grade-4 Review (3)

1 I read 15 pages of 240-page book every day. Let's answer the following questions.

1 Summarize the relationship between the number of read pages and number of remaining pages in a table.

Number of read pages	15	30	45	60	75	90	105
Number of remaining pages	225	210	195	180	165	150	135

2 If the number of read increase by 15 cm, how does the number of remaining pages change?

Decrease by 15 cm

3 Looking at the table and let's make a math sentence that the number of read pages is ○ pages and number of remaining pages is □ pages.

$240 - \bigcirc = \square$

4 If the number of read page is 150 pages, what is the number of remaining pages?

90 pages

2 We ride a bus. The bus goes 40 km par an hour.

1 Summarize the relationship between the hour and distance to go in a table.

Hour	0	1	2	3	4	5	6	7	8	...
Distance to go (km)	0	40	80	120	160	200	240	280	320	...

3 Looking at the table and let's make a math sentence that the hour is ○ hour and the distance to go is □ km.

$40 \times \bigcirc = \square$

4 If you ride the bus 6 hours, how many km you can go?

240 km

5 My sister live in the village 140 km away from my house. How many hours will it take to get to my sister's village by this bus?

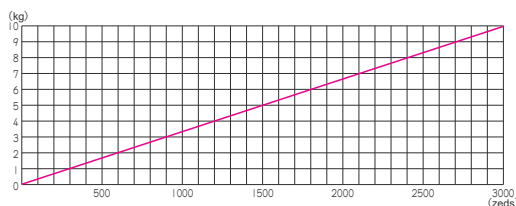
3.5 hours

3 There are the potato in the shops. 1 kg cost 300 zeds.

1 Summarize the relationship between the kg of potato and price in a table.

Kg of potato	0	1	2	3	4	5	6	7	8	9	10
zeds (Price)	0	300	600	900	1200	1500	1800	2100	2400	2700	3000

2 Look at the table and draw a graph.



3 If the kg of potato increase by 1 kg, how does the price change?

Increase by 300 zeds

4 Looking at the table and let's make a math sentence that the kg of potato is ○ kg and price is □.

$300 \times \bigcirc = \square$

5 If we buy 10 kg of potatoes, what is the price?

3000 zeds

6 If the price is 2700 zeds, how many kg of potatoes did you buy?

9 kg

7 If you buy 2.5 kg of potatoes, how many kg of potatoes can you buy?

750 zeds

8 If you have 450 zeds, how many kg of potatoes can you buy?

1.5 kg

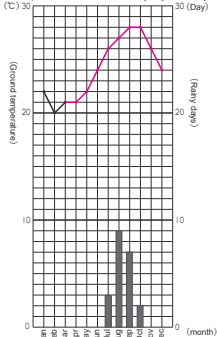
Data Utilization

Entire Grade-4 Review (4)

1 A farmer is considering planting plans. The table below shows grand temperature in a line graph and number of rainy days in a bar graph in each month. Finish drawing the line graphs and answer the following questions.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature in country A (°C)	22	20	21	21	22	24	26	27	28	28	26	24
Number of rainy days in country A (day)	0	0	0	0	0	0	3	9	7	2	0	0

Ground temperatures and number of rainy day in Country A (°C) 30 (day) 30 (day)



1 In which month was the temperature highest? How much was it?

Month: September, October Temperature: 28 °C

2 In which month was the temperature lowest? How much was it?

Month: February Temperature: 20 °C

3 In which month was the number of rainy days most? How many days were there?

Month: August Rainy Days: 9

4 If you have to sow seeds before rain, in which month is the most appropriate?

June

2 A teacher planned to have an online lesson and investigated if his classmates had PCs or smartphones. The following information was gathered.

- 24 children have PCs.
- 11 children have PCs and smartphones.
- 8 children have smartphones but no PCs.
- 18 children do not have smartphones.
- A boy's class has 37 children.

1 Fill in the blank of the table with the numbers of children you know.

		PCs		Total
		Have	Do not have	
Smartphones	Have	11	8	19
	Do not have	13	5	18
Total		24	13	37

2 How many children do not have neither PCs nor smartphones?

5

3 How many children only have PCs?

13

4 How many children do not have PCs?

13

5 How many children have smartphones?

19

