5 - 1 Division Algorithm-2

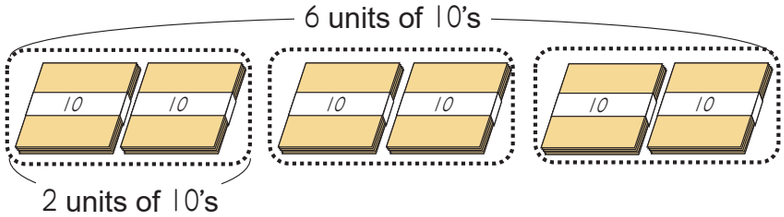
Dividing by Multiples of 10 (1)

Example Calculate 60 ÷ 20.

6 ÷ 2 = 3

60 ÷ 20 = 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 ÷ 20 by simply dividing 6 by 2.



1 Calculate the following division problems in your head.

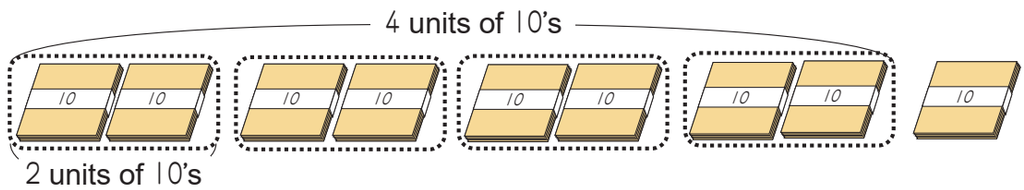
1. 60 ÷ 30 = ☐
2. 80 ÷ 20 = ☐
3. 90 ÷ 30 = ☐
4. 160 ÷ 40 = ☐
5. 240 ÷ 40 = ☐
6. 350 ÷ 50 = ☐
7. 300 ÷ 60 = ☐
8. 560 ÷ 80 = ☐
9. 630 ÷ 70 = ☐

Example 2 Calculate 90 ÷ 20.

9 ÷ 2 = 4 R 1

90 ÷ 20 = 4 R 10

If we use 10 as a single unit, the problem will be a 6 ÷ 2 and the answer will be 4 R 1. Remember, since 1 is actually a unit of 10, the remainder will therefore be 10.



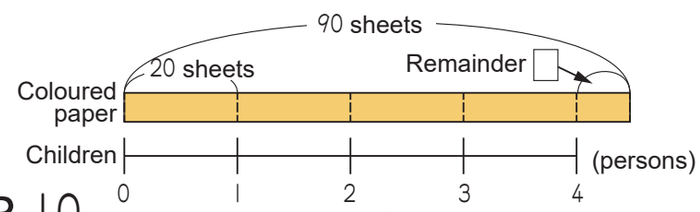
2 Calculate the following division problems in your head.

1. 70 ÷ 20 = ☐
2. 80 ÷ 30 = ☐
3. 130 ÷ 30 = ☐
4. 150 ÷ 60 = ☐
5. 350 ÷ 80 = ☐
6. 600 ÷ 80 = ☐

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.



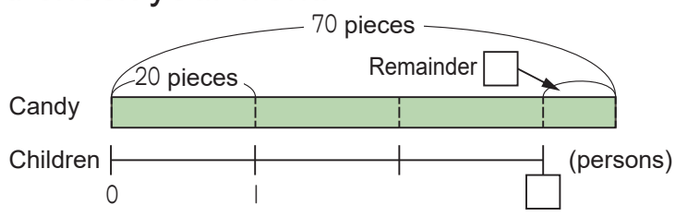
Math sentence

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

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

Answer

Check

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

Answer

Check

5 - 3 Division Algorithm-2

Division Algorithm (1)

Example Calculate 48 ÷ 12.

Hiding the numbers in the ones place with a pencil can help us think it easier.

Think of dividing 48 by 21. (Think of 40 ÷ 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 ÷ 12 = 4

Write

Multiply

Subtract

Sometimes, rounding the divisor can help us pick the correct quotient. We will still need to multiply the quotient by the actual divisor!

Check the answer:
12 × 4 = 48

Calculate the following division problems by using the algorithm.

1 48 ÷ 24

2 96 ÷ 32

3 55 ÷ 11

4 86 ÷ 43

5 66 ÷ 22

6 48 ÷ 12

7 68 ÷ 34

8 69 ÷ 23

9 84 ÷ 21

10 93 ÷ 31

11 84 ÷ 21

12 39 ÷ 13

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

5 - 4 Division Algorithm-2

Division Algorithm (2)

Example Calculate 87 ÷ 21.

Think of dividing 87 by 21.
(Think of 80 ÷ 20 and guess a quotient.)

Tens	Ones
	4
2 1)	8 7

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

Tens	Ones
	4
2 1)	8 7
	8 4

Multiply 21 by 4.
Write an 84.

Tens	Ones
	4
2 1)	8 7
	8 4
	3

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

The remainder is 3.

87 ÷ 21 = 4 R3

Write
Multiply
Subtract

Sometimes, rounding the divisor can help us find the correct quotient. Round 21 down to 20.
20 × 4 is close to 87 without going over. We still need to multiply 21 × 4 to solve the problem!

Check the answer:
21 × 4 + 3 = 87

Calculate the following division problems by using the algorithm.

1. 85 ÷ 21

Tens	Ones
2 1)	8 5

2. 37 ÷ 12

Tens	Ones
1 2)	3 7

3. 88 ÷ 43

Tens	Ones
4 3)	8 8

4. 95 ÷ 31

Tens	Ones
3 1)	9 5

5. 68 ÷ 22
6. 67 ÷ 32
7. 46 ÷ 11
8. 67 ÷ 33
9. 88 ÷ 42
10. 44 ÷ 13
11. 74 ÷ 34
12. 31 ÷ 28

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

5 - 5 Division Algorithm-2

Division Algorithm (3)

Example Calculate 94 ÷ 32.

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

	Tens	Ones
		3
32)	9	4

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

	Tens	Ones
		3
32)	9	4
	9	6

Multiply 32 by 3. Write a 96.

We find that 96 is larger than 94 and the estimated quotient is too large.

Write

Multiply

Write the quotient, 2, in the ones place.

	Tens	Ones
		2
32)	9	4

If an estimated quotient is too large, replace it with a quotient that is smaller by 1.

Multiply 32 by 2. Write a 64.

	Tens	Ones
		2
32)	9	4
	6	4

Subtract 64 from 94. Write a 30.

The remainder is 30.

	Tens	Ones
		2
32)	9	4
	6	4
	3	0

94 ÷ 32 = 2 R30

Check the answer:
32 × 2 + 30 = 94

Write

Multiply

Subtract

Calculate the following division problems by using the algorithm.

1 91 ÷ 31

	Tens	Ones
31)	9	1

2 83 ÷ 21 =

	Tens	Ones
21)	8	3

3 58 ÷ 12

	Tens	Ones
12)	5	8

4 62 ÷ 22

	Tens	Ones
22)	6	2

5 96 ÷ 33

6 67 ÷ 23

7 78 ÷ 43

8 48 ÷ 32

9 85 ÷ 34

10 79 ÷ 22

11 51 ÷ 13

12 62 ÷ 24

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

5 - 6 Division Algorithm-2

Division Algorithm (4)

Example Calculate 87 ÷ 17.

Think of 17 as 20.

Think of dividing 87 by 17.
(Think of 17 as 20 and 80 ÷ 20. Then 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.

We find that 19 is larger than 17 and the estimated quotient, 4 is too small.

Write the estimated quotient, 5, in the ones place.

Multiply 17 by 5. Write an 85.

If an estimated quotient is too small, replace it with a quotient that is larger by 1.

Subtract 85 from 87. Write a 2.

The remainder is 2.

87 ÷ 17 = 5 R2

Check the answer:
17 × 5 + 2 = 87

Write / Multiply / Subtract

Calculate the following division problems by using the algorithm.

1. 83 ÷ 27
2. 58 ÷ 19
3. 87 ÷ 28
4. 91 ÷ 18
5. 79 ÷ 26
6. 60 ÷ 17
7. 56 ÷ 27
8. 41 ÷ 19
9. 95 ÷ 29
10. 85 ÷ 38
11. 77 ÷ 25
12. 67 ÷ 16

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

5 - 7 Division Algorithm-2

Division Algorithm (5)

Example Calculate 172 ÷ 21.

Divide 17 by 21.

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

Multiply 21 by 0. Write 0.

Subtract 0 from 17. Write a 17.

Bring down the 2 in the ones place.

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

Multiply 21 by 8. Write a 168.

Subtract 168 from 172. Write a 4.

The remainder is 4.

172 ÷ 21 = 8 R4

Check the answer:
21 × 8 + 4 = 172

Calculate the following division problems by using the algorithm.

1. 158 ÷ 22
2. 169 ÷ 32
3. 315 ÷ 43
4. 336 ÷ 51
5. 584 ÷ 62
6. 300 ÷ 74
7. 271 ÷ 53
8. 266 ÷ 86
9. 707 ÷ 98
10. 300 ÷ 48
11. 344 ÷ 67
12. 643 ÷ 76

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

5 - 8 Division Algorithm-2

Division Algorithm (6)

Example Calculate 345 ÷ 21.

Think of dividing 34 by 21 (Think of 30 ÷ 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.

345 ÷ 21 = 16 R 9

Check the answer:

21 × 16 + 9 = 345

Calculate the following division problems by using the algorithm.

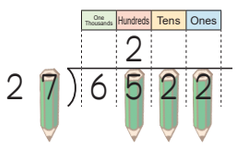
1. 385 ÷ 12 = ☐
2. 897 ÷ 42 = ☐
3. 639 ÷ 14
4. 431 ÷ 35
5. 526 ÷ 25
6. 761 ÷ 34
7. 277 ÷ 18
8. 352 ÷ 28
9. 499 ÷ 23
10. 989 ÷ 31

3		4		5		6	
7		8		9		10	

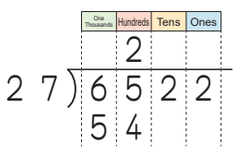
5 - 9 Division Algorithm-2

Division Algorithm (7)

Example Calculate 6522 ÷ 27.

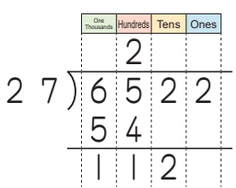


Think of dividing 65 by 27 (Think of 60 ÷ 30 and guess a quotient. We can estimate 2).



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

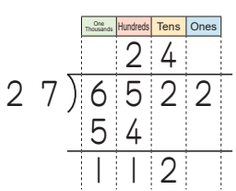
Multiply 27 by 2. Write a 54.



Subtract 54 from 65. Write an 11.

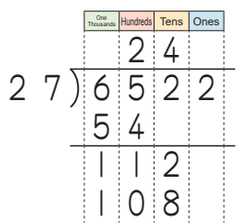
Bring down 2 from the tens place.

Divide 112 by 27.

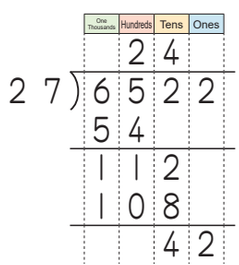


Write the estimated quotient, 4, in the tens place.

Write → Multiply → Subtract → Bring down → Write

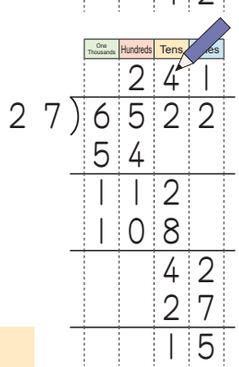


Multiply 27 by 4. Write a 108.



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.

6522 ÷ 27 = 241 R 15

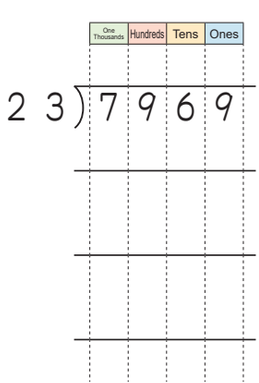
Multiply → Subtract → Bring down → Write → Multiply → Subtract

Check the answer:

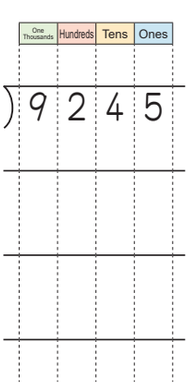
27 × 241 + 15 = 6522

Calculate the following division problems by using the algorithm.

1. 7969 ÷ 23 = ☐



2. 9245 ÷ 38 = ☐



3. 7674 ÷ 42

4. 8773 ÷ 54

5. 8095 ÷ 63

6. 7994 ÷ 71

7. 8961 ÷ 52

8. 9738 ÷ 31

9. 9741 ÷ 45

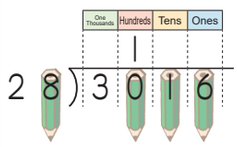
10. 6869 ÷ 18

3		4		5		6	
7		8		9		10	

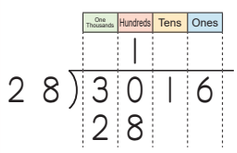
5 – 10 Division Algorithm-2

Division Algorithm (8)

Example Calculate 3016 ÷ 28.

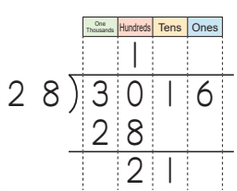


Think of dividing 30 by 28 (Think of 28 as 30 and 30 ÷ 30. Then guess a quotient).



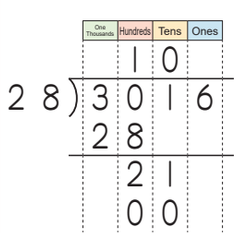
Write the estimated quotient, 1, in the hundreds place.

Multiply 28 by 1. Write a 28.



Subtract 28 from 30. Write a 2.

Bring down 1 from the tens place.

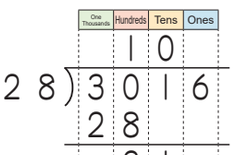


Divide 21 by 28 (21 ÷ 28 = 0 R21).

Write the quotient, 0, in the tens place..

Multiply 28 by 0. Write a 0.

Write / Multiply / Subtract / Bring down / Write / Multiply

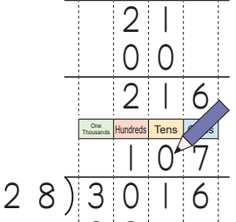


Subtract 0 from 21. Write 21.

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. Write a 20. The remainder is 15.

3016 ÷ 28 = 107 R 20

Subtract / Bring down / Write / Multiply / Subtract

Check the answer:

28 × 107 + 20 = 3016

Calculate the following division problems by using the algorithm.

1 5679 ÷ 52 = ☐

2 3954 ÷ 19 = ☐

3 7021 ÷ 23

4 4458 ÷ 41

5 7896 ÷ 13

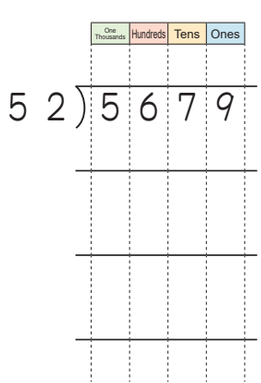
6 9231 ÷ 23

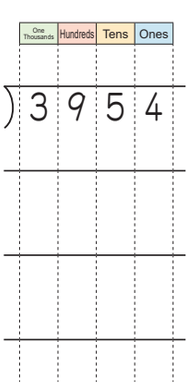
7 5773 ÷ 54

8 8354 ÷ 27

9 4871 ÷ 47

10 7053 ÷ 34



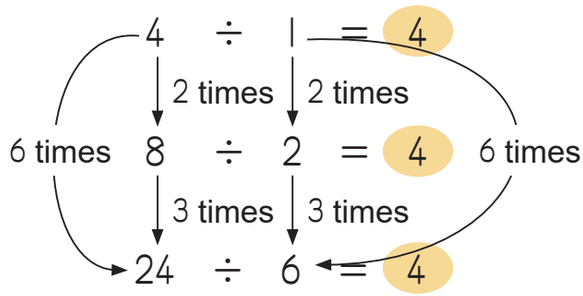


3		4		5		6	
7		8		9		10	

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 ÷ 6 becomes 8 ÷ 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 → [15] bundles of paper 150 ÷ 50 = 3
50 sheets → [5] bundles of paper 15 ÷ 5 = 3

Math sentence 150 ÷ 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 → ☐ 18 ÷ 6 = ☐

60 pencils → ☐ Math sentence

Answer _____

2 Think of 6 pencils as 1 unit.

180 pencils → ☐ 30 ÷ 10 = ☐

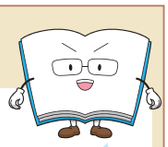
60 pencils → ☐ Math sentence

Answer _____

5 - 12 Division Algorithm-2

Simplifying Division Algorithm

Example 1 Think about how to calculate 2800 ÷ 400.



$$\begin{array}{r} 7 \\ 4\,0\,0\overline{)\,2\,8\,0\,0} \\ 2\,8 \\ \hline 0 \end{array}$$

2800 ÷ 400 = 6

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

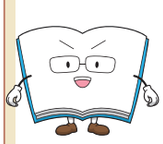
2800 ÷ 400
÷ 10 ÷ 10
280 ÷ 40
÷ 10 ÷ 10
28 ÷ 4

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 ÷ 80 = ☐ 2 2400 ÷ 600 = ☐ 3 7200 ÷ 900 = ☐

Example 2 Think about how to calculate 24000 ÷ 500.



$$\begin{array}{r} 4\,8 \\ 5\,0\,0\overline{)\,2\,4\,0\,0\,0} \\ 2\,0 \\ \hline 4\,0 \\ 4\,0 \\ \hline 0 \end{array}$$

24000 ÷ 500 = 48

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

24000 ÷ 500
÷ 10 ÷ 10
2400 ÷ 50
÷ 10 ÷ 10
240 ÷ 5

Think about how to calculate the following division problems.

1 7500 ÷ 300 = ☐

$$\begin{array}{r} \square\,\square \\ 3\,0\,0\overline{)\,7\,5\,0\,0} \\ \square \\ \hline \square\,\square \\ \square\,\square \\ \hline \square \end{array}$$

2 22200 ÷ 600 = ☐

$$6\,0\,0\overline{)\,2\,2\,2\,0\,0}$$

5 - 13 Division Algorithm-2

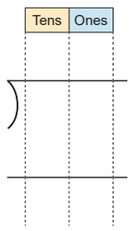
Review

1 Calculate the following by using the properties of division.

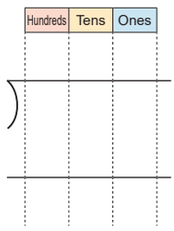
1. 320 ÷ 40 = ☐
2. 420 ÷ 70 = ☐
3. 320 ÷ 80 = ☐
4. 1600 ÷ 800 = ☐
5. 72000 ÷ 900 = ☐
6. 3600 ÷ 60 = ☐

2 Calculate the following by using the division algorithm.

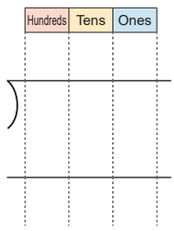
1. 91 ÷ 18 = ☐



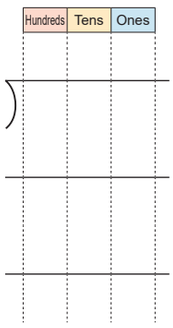
2. 359 ÷ 51 = ☐



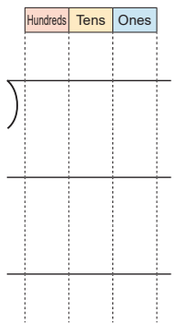
3. 459 ÷ 74 = ☐



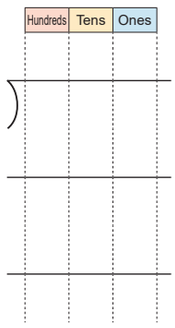
4. 389 ÷ 12 = ☐



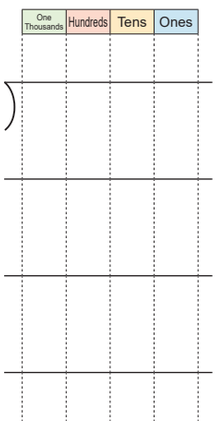
5. 563 ÷ 36 = ☐



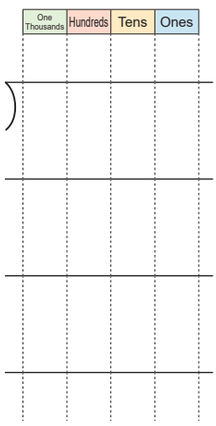
6. 752 ÷ 43 = ☐



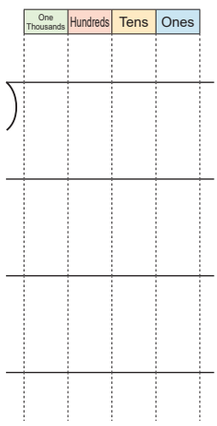
7. 5618 ÷ 52 = ☐



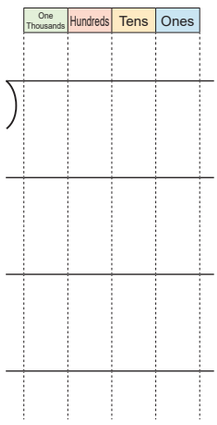
8. 8799 ÷ 29 = ☐



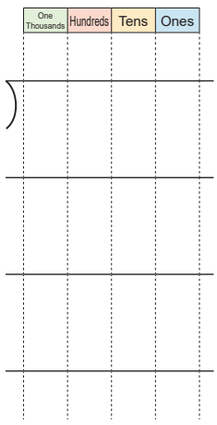
9. 7500 ÷ 36 = ☐



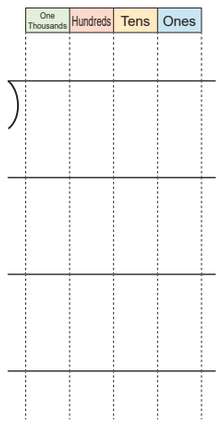
10 9158 ÷ 39 = ☐



11 8173 ÷ 25 = ☐

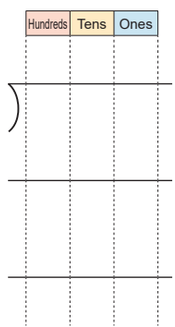


12 8300 ÷ 18 = ☐



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



Answer

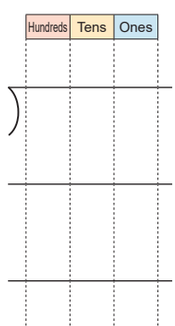
_____

Check

_____

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



Answer

_____

Check

_____