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Whole Numbers and Decimal Numbers

Structure of Decimal Numbers (1)

Instruction The official distance for a marathon is 42.195 km. The structure of this number is as shown below.

$\begin{array}{ c c } \hline 10 & 10 \\ \hline 10 & 10 \\ \hline \end{array}$	$\begin{array}{ c c } \hline 1 & 1 \\ \hline \end{array}$	$\begin{array}{ c } \hline 0.1 \\ \hline \end{array}$	$\begin{array}{ c c c c c } \hline 0.01 & 0.01 & 0.01 & 0.01 & 0.01 \\ \hline 0.01 & 0.01 & 0.01 & 0.01 & 0.01 \\ \hline \end{array}$	$\begin{array}{ c c c } \hline 0.001 & 0.001 & 0.001 \\ \hline 0.001 & 0.001 & 0.001 \\ \hline \end{array}$
Tens Place	Ones Place	Tenths Place	Hundredths Place	Thousandths Place
4	2	1	9	5



We can use the numerals 0 through 9 and a decimal point to express whole numbers and decimal numbers of any size.

$$\begin{array}{r}
 \boxed{4} \boxed{2} \boxed{.} \boxed{1} \boxed{9} \boxed{5} \\
 = 40 \text{-----} | 0 \quad \times \quad \boxed{4} \\
 + 2 \text{-----} | \quad \times \quad \boxed{2} \\
 + 0.1 \text{-----} 0.1 \quad \times \quad \boxed{1} \\
 + 0.09 \text{-----} 0.09 \quad \times \quad \boxed{9} \\
 + 0.005 \text{-----} 0.005 \quad \times \quad \boxed{5}
 \end{array}$$

$$42.195 = 10 \times 4 + 1 \times 2 + 0.1 \times 1 + 0.01 \times 9 + 0.001 \times 5$$

Example Look at the structure of the number 23.567, write the correct number in the .

1 23.456

$$\begin{array}{r}
 = 20 \text{-----} 10 \quad \times \quad \boxed{2} \\
 + 3 \text{-----} | \quad \times \quad \boxed{3} \\
 + 0.4 \text{-----} 0.1 \quad \times \quad \boxed{4} \\
 + 0.05 \text{-----} 0.01 \quad \times \quad \boxed{5} \\
 + 0.006 \text{-----} 0.001 \quad \times \quad \boxed{6}
 \end{array}$$

2 23.456 = 20 + 3 + 0.4 + 0.05 + 0.006

$$\begin{array}{r}
 = 10 \times \boxed{2} + 1 \times \boxed{3} \\
 + 0.1 \times \boxed{4} + 0.01 \times \boxed{5} \\
 + 0.001 \times \boxed{6}
 \end{array}$$

Look at the structure of the following numbers and write the correct number in the .

1 3.579

$$\begin{array}{r}
 = 3 \text{-----} | \quad \times \quad \boxed{} \\
 + 0.5 \text{-----} 0.1 \quad \times \quad \boxed{} \\
 + 0.07 \text{-----} 0.01 \quad \times \quad \boxed{} \\
 + 0.009 \text{-----} 0.001 \quad \times \quad \boxed{}
 \end{array}$$

2 10.975

$$\begin{array}{r}
 = 10 \text{-----} 10 \quad \times \quad \boxed{} \\
 + 0 \text{-----} | \quad \times \quad \boxed{} \\
 + 0.9 \text{-----} 0.1 \quad \times \quad \boxed{} \\
 + 0.07 \text{-----} 0.01 \quad \times \quad \boxed{} \\
 + 0.005 \text{-----} 0.001 \quad \times \quad \boxed{}
 \end{array}$$

3 2.863 = 2 + 0.8 + 0.06 + 0.003 = 1 × + 0.1 × + 0.01 × + 0.001 ×

4 30.17 = 30 + 0 + 0.1 + 0.07 = 10 × + 1 × + 0.1 × + 0.01 ×

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Whole Numbers and Decimal Numbers

Structure of Decimal Numbers (2)

Example

Solve the math sentence. Write the answer in the .

$$10 \times 4 + 1 \times 2 + 0.1 \times 1 + 0.01 \times 9 + 0.001 \times 5$$

42.195



It might be easier to understand if it is written this way.

4	2	.	1	9	5	
=	4	0				0
+			2			
+			0	.	1	
+			0	.	0	9
+			0	.	0	0
						5

1 Write each number in the following math sentences.

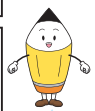
1 $10 \times 2 + 1 \times 6 + 0.1 \times 5 + 0.01 \times 3 + 0.001 \times 4$

2 $10 \times 3 + 1 \times 1 + 0.1 \times 2 + 0.01 \times 7 + 0.001 \times 8$

3 $100 \times 1 + 10 \times 2 + 1 \times 4 + 0.1 \times 3 + 0.01 \times 5 + 0.001 \times 6$

4 $100 \times 2 + 10 \times 5 + 1 \times 3 + 0.01 \times 4 + 0.001 \times 8$

5 $1 \times 4 + 0.1 \times 7 + 0.001 \times 5$



2 Write the math sentence that equals the number given.

1 $5.64 = 5 + 0.6 + 0.04 =$

2 $24.789 = 20 + 4 + 0.7 + 0.08 + 0.009 =$

3 $61.035 = 60 + 1 + 0.03 + 0.005 =$

4 $987.021 = 900 + 80 + 7 + 0.02 + 0.001 =$

5 $402.104 = 400 + 2 + 0.1 + 0.004 =$

Focus on each individual number. Otherwise, there could be many answers.

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Whole Numbers and Decimal Numbers

Structure of Decimal Numbers (3)

Example Make the largest and smallest possible numbers by placing the numbers in the .

 .

Largest number

Smallest number



When creating the largest possible number, place the highest value digit on the left. In decreasing value order, place the lower digit on the right. When creating the lowest possible number, place the lowest value digit on the left. In increasing value order, place the highest digit on the right.

1 Make the following numerals by placing the numbers in the . Use each number only once and fill in all the .

 .

1 Largest number

2 Smallest number

3 The number that is closest to 30.

2 Make the following numerals by placing the numbers in the . Use each number only once and fill in all the .

 .

1 Largest number

2 Smallest number

3 The number that is closest to 40.

4 The number that is closest to 50.

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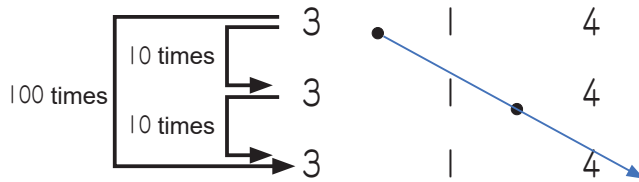
Whole Numbers and Decimal Numbers

Structure of Decimal Numbers (4)

Instruction What happens when 3.14 is multiplied by 10? When it is multiplied by 100?

	Hundreds Place	Tens Place	Ones Place	Tenths Place	Hundredths Place	Thousandths Place
10 times			3	.	1	4
100 times		3	.	1	4	
100 times	3	.	1	4		

The same can be expressed below.



When a decimal number is multiplied by 10, the digits move to the left one place. When a decimal number is multiplied by 100, the digits move to the left two places.

Example Multiply the decimal number.

10 times 3.14

31.4

100 times 3.14

314

1 Multiply the decimal number.

1 2.37 times 10 times 100

2 0.468 times 10 times 100

3 0.095 times 10 times 100

2 How many times was 1.34 multiplied to get the following numbers?

1 13.4

2 134

3 How many times was 0.76 multiplied to get the following numbers?

1 76

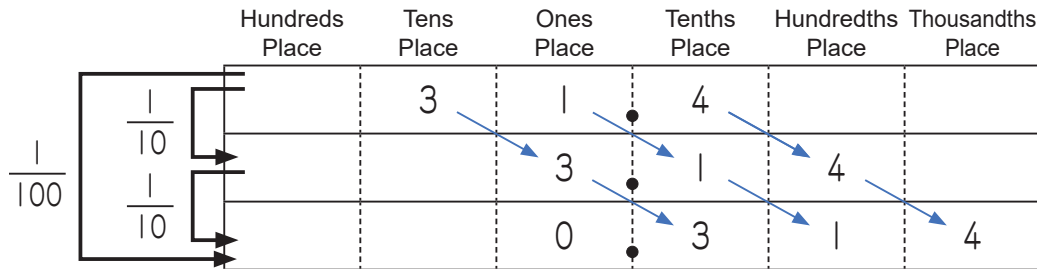
2 7.6

1 - 5

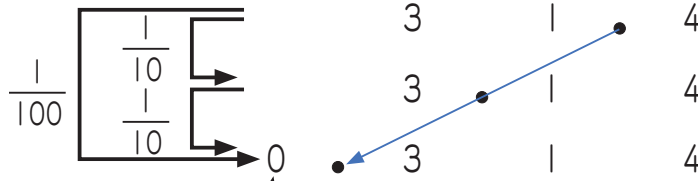
Whole Numbers and Decimal Numbers

Structure of Decimal Numbers (5)

Instruction What happens when 31.4 is multiplied by $\frac{1}{10}$? By $\frac{1}{100}$?



The same can be expressed below.



Don't forget to put 0.

When a decimal number is multiplied by $\frac{1}{10}$, the digits move to the right by one place. When a decimal number is multiplied by $\frac{1}{100}$, the digits move to the right by two places.

Example Write the decimal number.

$\frac{1}{10}$ times 31.4

$\frac{1}{100}$ times 31.4

1 Multiply the decimal numbers.

1 71.5 times $\frac{1}{10}$ times $\frac{1}{100}$

2 2.83 times $\frac{1}{10}$ times $\frac{1}{100}$

3 10.06 times $\frac{1}{10}$ times $\frac{1}{100}$

2 What fraction was 12.4 multiplied by to get the following numbers?

1 1.24 2 0.124

3 What fraction was 8.09 multiplied by to get the following numbers?

1 0.0809 2 0.809

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Whole Numbers and Decimal Numbers

Review

1 Look at the structure of the following numbers. Write the correct numbers in the .

1 56.789

$$\begin{array}{r}
 = 50 \text{ ----- } 10 \quad \times \quad \square \\
 + 6 \text{ ----- } 1 \quad \times \quad \square \\
 + 0.7 \text{ ----- } 0.1 \quad \times \quad \square \\
 + 0.08 \text{ ----- } 0.01 \quad \times \quad \square \\
 + 0.009 \text{ ----- } 0.001 \quad \times \quad \square
 \end{array}$$

2 9.876

$$\begin{array}{r}
 = 9 \text{ ----- } 1 \quad \times \quad \square \\
 + 0.8 \text{ ----- } 0.1 \quad \times \quad \square \\
 + 0.07 \text{ ----- } 0.01 \quad \times \quad \square \\
 + 0.006 \text{ ----- } 0.001 \quad \times \quad \square
 \end{array}$$

Focus on each individual number. Otherwise, there could be many answers.



2 Write the correct numbers in the .

1 $357.9 = 300 + 50 + 7 + 0.9 = 100 \times \square + 10 \times \square + 1 \times \square + 0.1 \times \square$

2 $12.34 = 10 + 2 + 0.3 + 0.04 = 10 \times \square + 1 \times \square + 0.1 \times \square + 0.01 \times \square$

3 $4.157 = 4 + 0.1 + 0.05 + 0.007 = 1 \times \square + 0.1 \times \square + 0.01 \times \square + 0.001 \times \square$

4 $7.067 = 7 + 0.06 + 0.007 = 1 \times \square + 0.01 \times \square + 0.001 \times \square$

5 $0.503 = 0.5 + 0.003 = 0.1 \times \square + 0.001 \times \square$

3 Write math sentences for the following decimal numbers.

1 $6.92 = 6 + 0.9 + 0.02 =$

2 $2.835 = 2 + 0.8 + 0.03 + 0.005 =$

3 $60.107 = 6 + 0.1 + 0.007 =$

4 Multiply the decimal numbers by the following numbers.

1 5.08 times 10 times 100

2 0.102 times 10 times 100

3 20.03 times 10 times 100

5 How many times was 37.4 multiplied by to get the following numbers?

1 37.4 **2** 374

6 Multiply the decimal number by the fraction.

1 29.7 times $\frac{1}{10}$ times $\frac{1}{100}$

2 6.03 times $\frac{1}{10}$ times $\frac{1}{100}$

3 40.05 times $\frac{1}{10}$ times $\frac{1}{100}$

7 What fraction was 30.8 multiplied by to get the following answers?

1 3.08 **2** 0.308

8 Make the following numerals by placing the numbers in the . Use each Number only once and fill in all the .

. 0 1 3 4 6 7 9

1 Largest number

2 Smallest number

3 The number that is closest to 20.

4 The number that is closest to 70.