Place Value

Vocabulary

Decimal Point
A dot that separates the whole part of a number from the fractional part.

Decimal Place
The position of a digit to the right of the decimal point.

Understand numbers written in words and digits

Understand place value

Order decimals

Starter

Write these numbers in digits.

a) Three thousand and forty-six.

b) One hundred and fifty thousand.

c) One million, one thousand, two hundred and nine.

Solution

Write these numbers in digits.

a) Three thousand and forty six. **3 046**

b) One hundred and fifty thousand. **150 000**

c) One million, one thousand, two hundred and nine. **1 001 209**

M	Hth	Tth	Th	H	T	O
			3	0	4	6
	1	5	0	0	0	0
1	0	0	1	2	0	9

Exercise

Write these numbers in figures:

1. Three thousand and twenty
2. Twenty two thousand four hundred
3. Ten thousand two hundred and nine
4. Three million, two hundred thousand
5. Three hundred and sixty thousand
6. One million, nine hundred and twenty

Write these numbers in figures:

1. Seven million, three hundred and twenty four thousand
2. Nine hundred and twelve thousand
3. One million, ten thousand, one hundred
4. Half a million

Write these numbers in figures:

1. One hundred thousand and eighty four
2. Three and a quarter billion

Solutions

Write these numbers in figures:

1. Three thousand and twenty **3 020**
2. Twenty two thousand four hundred **22 400**
3. Ten thousand two hundred and nine **10 209**
4. Three million, two hundred thousand **3 200 000**
5. Three hundred and sixty thousand **360 000**
6. One million, nine hundred and twenty **1 000 920**

Write these numbers in figures:

1. Seven million, three hundred and twenty four thousand **7 324 000**
2. Nine hundred and twelve thousand **912 000**
3. One million, ten thousand, one hundred **1 010 100**
4. Half a million **500 000**

Write these numbers in figures:

1. One hundred thousand and eighty four **100 084**
2. Three and a quarter billion **3 250 000 000**

Examples

What is the value of the green digit in each number?

a) 3 4 0 9

b) 9 6 1 3 4 5

c) 1 0 1 1 0

Solutions

What is the value of the green digit in each number?

a) 3 409

400
or **four hundred**

b) 961 345

900 000
or **nine hundred thousand**

c) 10 110

10
or **ten**

Exercise

Write down the value of each green digit:

a) 9 700

b) 500 500

c) 21 676

d) 3 409 212

e) 12 345

f) 100 111

g) 909 090

h) 6 000 000

i) 12 000 000

Solutions

Write down the value of each green digit:

a) 9 700
700

b) 500 500
500

c) 21 676
1 000

d) 3 409 212
400 000

e) 12 345
40

f) 100 111
100

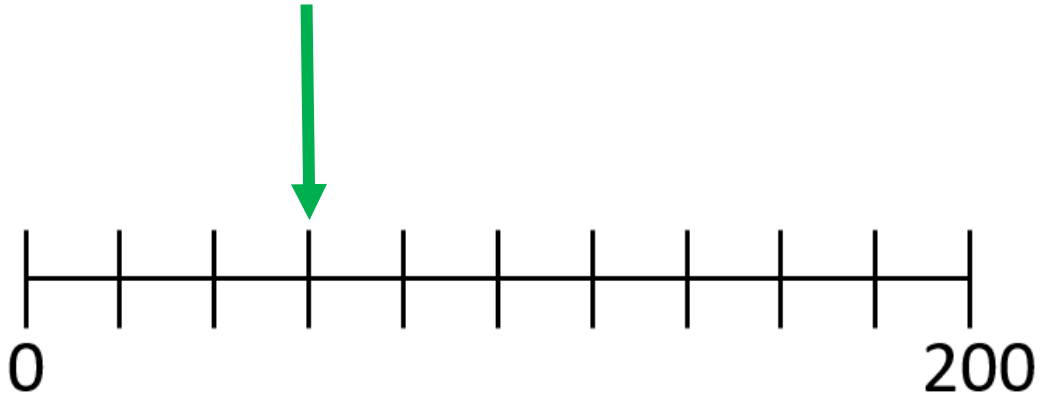
g) 909 090
9 000

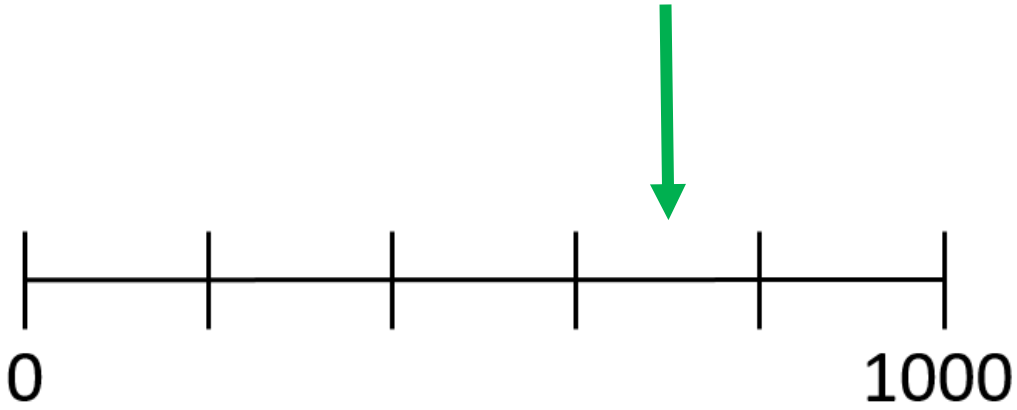
h) 6 000 000
6 000 000

i) 12 000 000
2 000 000

Reading Scales

What numbers are the arrows pointing to on these scales?





Reading Scales

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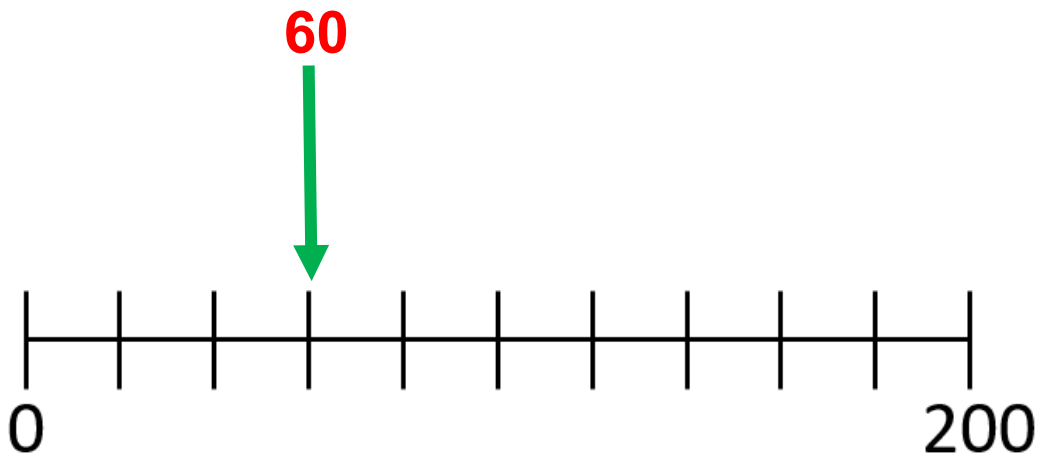

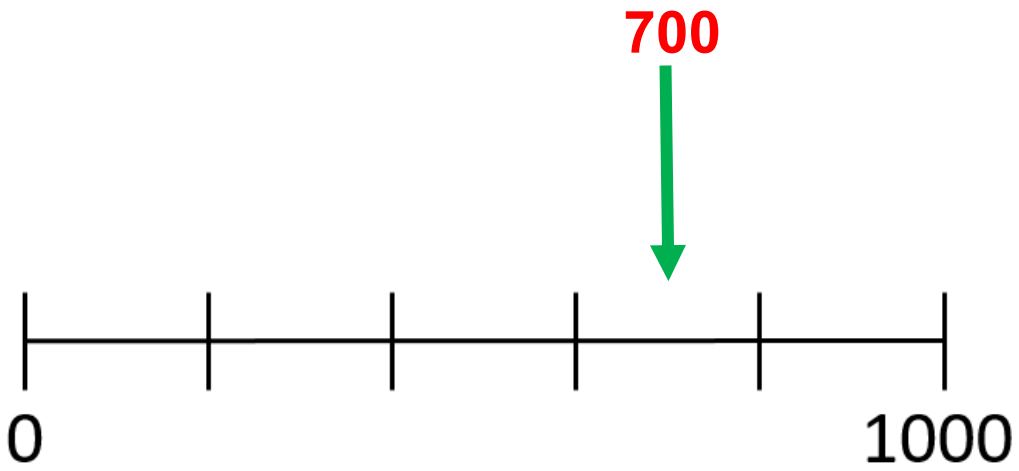

Exercise

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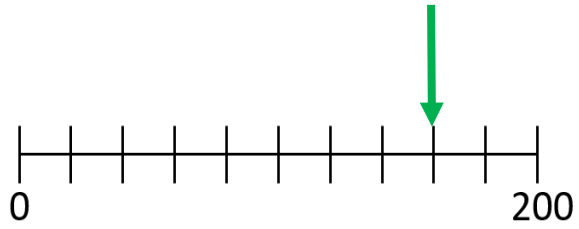
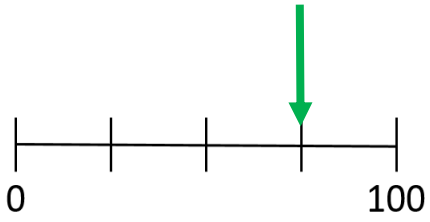
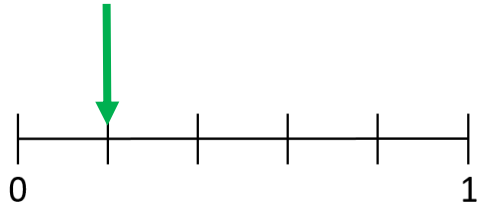
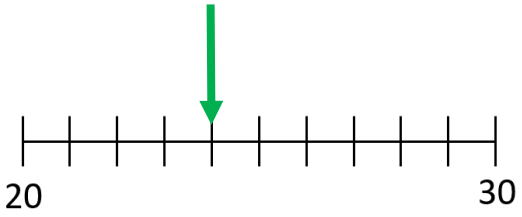
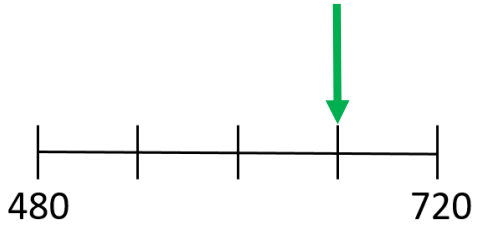
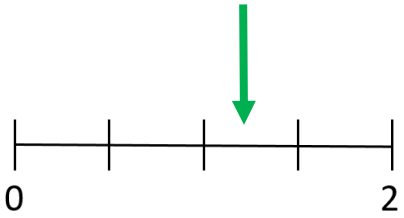


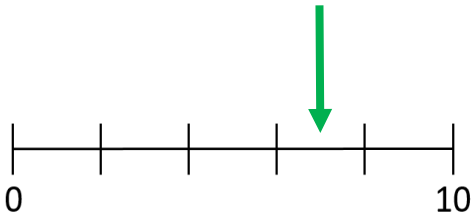


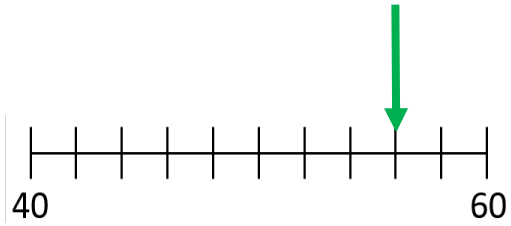


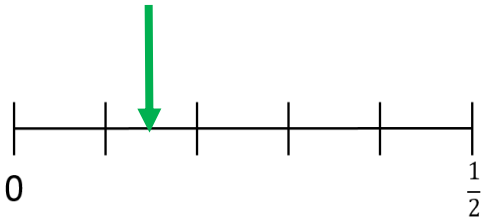






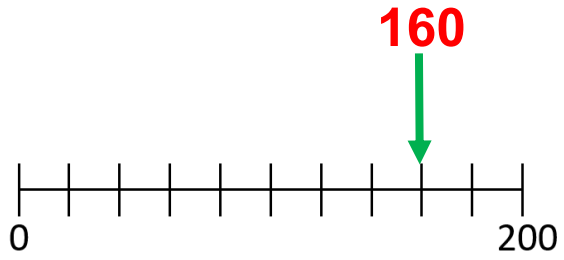


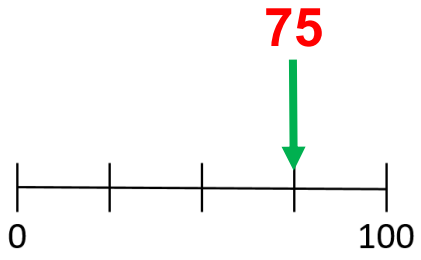


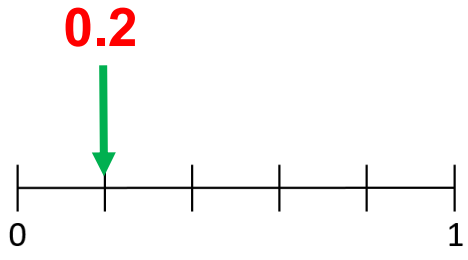


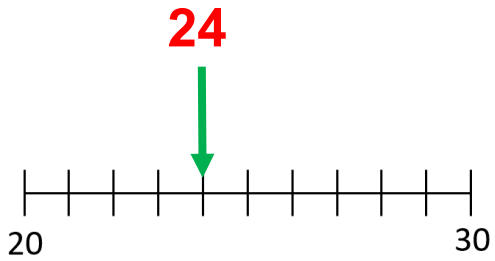
Solutions

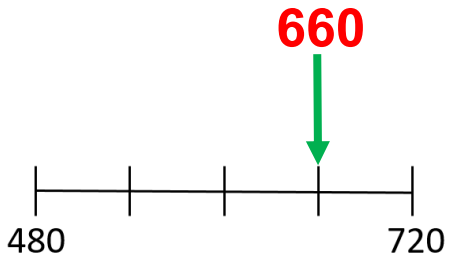
What numbers are the arrows pointing to on these scales?.

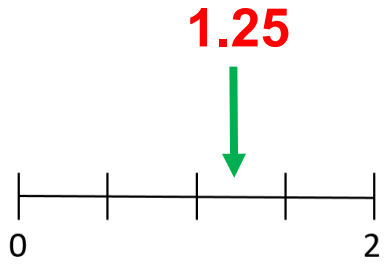


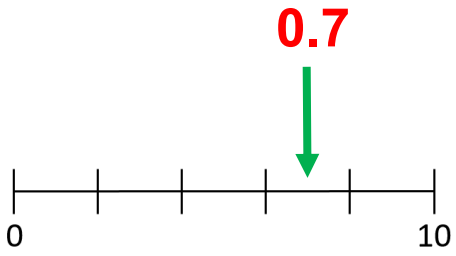


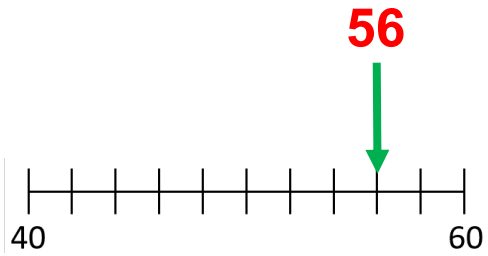


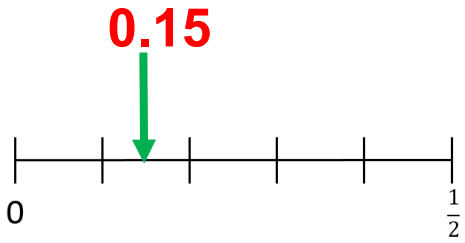












Decimals : Example

What is the value of the green digit in each number?

a) 0.59

b) 0.7493

Solutions

What is the value of the green digit in each number?

a) 0.59 0.5 or $\frac{5}{10}$

b) 0.7493 0.09 or $\frac{9}{100}$

Tens	Units		Tenths	Hundredths	Thousandths	Ten thousandths
0	0	.	5	9	0	0
0	0	.	7	4	9	3

Exercise

Write down the value of each green digit:

a) 0.03

b) 12.754

c) 1.239

d) 0.6

e) 99.4021

f) 13.001

g) 12.000 003

Challenge

How many numbers are there between 0.00001 and 0.00002?

Solutions

Write down the value of each green digit:

a) 0.03 0.03 or $\frac{3}{100}$

b) 12.754 0.7 or $\frac{7}{10}$

c) 1.239 0.009 or $\frac{9}{1000}$

d) 0.6 0.6 or $\frac{6}{10}$

e) 99.40210.000 1 or $\frac{1}{10\ 000}$

f) 13.001 0.001 or $\frac{1}{1000}$

g) 12.000 003 $0.000\ 003$ or $\frac{3}{1\ 000\ 000}$

Challenge

How many numbers are there between 0.00001 and 0.00002?

An infinite number

Ordering Decimals : Example

Which of these numbers is largest? 0.59 0.7

Solution

Which of these numbers is largest? $0.70 = \frac{70}{100}$ $0.59 = \frac{59}{100}$

Therefore $0.7 > 0.59$

Exercise

Write these numbers in ascending order

1. 0.8 , 0.72 , 0.691 , 0.7

2. 0.01 , 0.10 , 0.039 , 0.3

3. 7.9 , 7.89 , 7.98 , 7.8

Write these numbers in ascending order:

1. 4.381 , 4.49 , 4.5 , 4.38

2. 0.38 , $\frac{3}{8}$, $\frac{1}{3}$, 0.4

Which of these is largest?

$0.\dot{9}$, 1

Solutions

Write these numbers in ascending order

1. 0.8 , 0.72 , 0.691 , 0.7

   0.691 , 0.7 , 0.72 , 0.8

2. 0.01 , 0.10 , 0.039 , 0.3

   0.01 , 0.039 , 0.10 , 0.3

3. 7.9 , 7.89 , 7.98 , 7.8

   7.8 , 7.89 , 7.9 , 7.98

Write these numbers in ascending order:

1. 4.381 , 4.49 , 4.5 , 4.38

   4.38 , 4.381 , 4.49 , 4.5

2. 0.38 , $\frac{3}{8}$, $\frac{1}{3}$, 0.4

   $\frac{1}{3}$, $\frac{3}{8}$, 0.38 , 0.4

Which of these is largest?

$0.\dot{9}$, 1

They are the same!

Extension

In the binary number system, the number 2 is the **base** instead of 10.

In the binary system, we can write any number using just zeroes and ones.

1011 in binary is equal to 8 + 2 + 1 = 11

64	32	16	8	4	2	1
			1	0	1	1

Convert these numbers from binary to decimal.

a) 101 b) 1 111 c) 1 000 000

Convert these numbers from decimal to binary.

a) 18 b) 23 c) 100

Solution

In the binary number system, the number 2 is the base instead of 10.

In the binary system, we can write any number using just zeroes and ones.

1011 in binary is equal to 8 + 2 + 1 = 11

64	32	16	8	4	2	1
			1	0	1	1

Convert these numbers from binary to decimal.

a) 101 **= 5**

b) 1 111 **= 15**

c) 1 000 000 **= 64**

Convert these numbers from decimal to binary.

a) 18 **= 10010**

b) 23 **= 10111**

c) 100 **= 4**

Exam Style Question

Circle the value of the digit 6 in 0.067

$\frac{1}{60}$ $\frac{1}{6}$ $\frac{6}{100}$ $\frac{6}{10}$

Solution

Circle the value of the digit 6 in 0.067

$\frac{1}{60}$ $\frac{1}{6}$ $\frac{6}{100}$ $\frac{6}{10}$