Understand and write integers up to one billion in words and figures

1 Represent these numbers on a place value chart.

Write each number in figures.

a) seven thousand, five hundred and sixty-one

b) one hundred and thirty thousand, eight hundred

c) nine million and seventy

d) nine million and seven

2 What number is represented?

Write the number in figures and words.

HTh	TTh	Th	H	T	O
●	●● ●	●●		●● ●	●● ●

_____

_____

3 What number is represented?

Write the number in figures and words.

HM	TM	M	HTh	TTh	Th	H	T	O
	●●	●● ● ●● ● ●	●● ●		●●	●● ● ●	●●	

_____

_____

4 Write the numbers below in words.

a) 9,570

_____

_____

b) 89,904

_____

_____

c) 8,320,050

_____

_____

d) 1,000,000,000

_____

_____

5 Here is a number represented on a place value chart.

HM	TM	M	HTh	TTh	Th	H	T	O
	1	5	2	5	0	5	0	8

a) What is 1 million more than the number?

b) What is 100,000 more than the number?

c) What is thirty thousand more than the number?

6 Mrs Baldwin writes a number on the board.

500,000

The number is half a million.

The number is five hundred thousand.
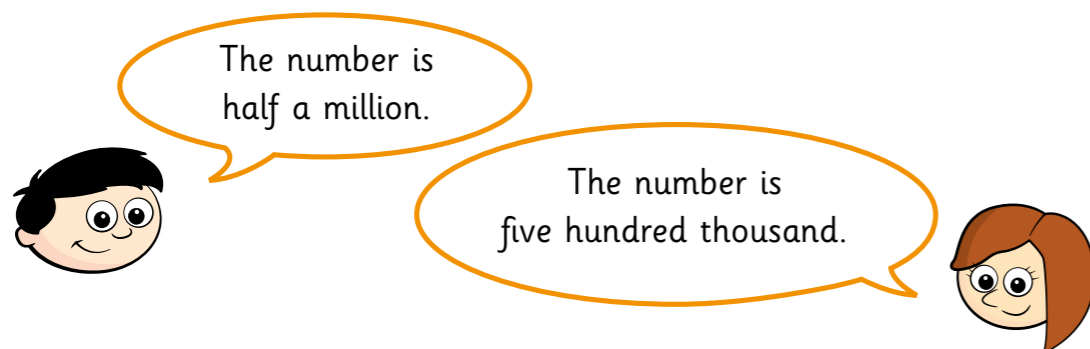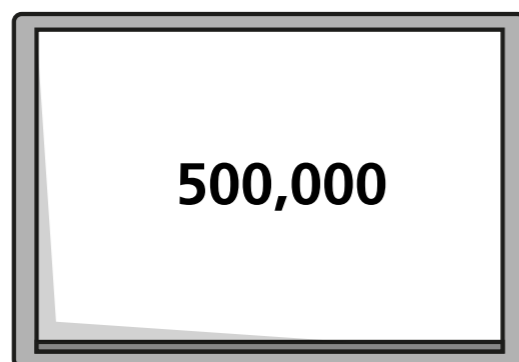
Explain why Dexter and Rosie are both correct.

_____

_____

7 Tommy writes forty two million, five hundred and ten thousand and eighty-nine in figures.

42 510 89

a) What mistake has Tommy made?

_____

_____

b) Write forty-two million, five hundred and ten thousand and eighty-nine in figures.

8 a) The population of the United States of America is 329,002,327
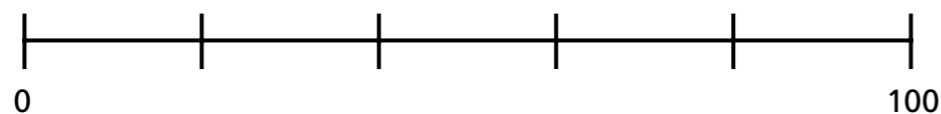
Write this number in words.

_____

_____

b) The population of the United Kingdom is 66.85 million.

Write this number in words and figures.

_____

_____

c) The population of Brazil is nearly a quarter of a billion.

Write this number in figures.

Work out intervals on a number line

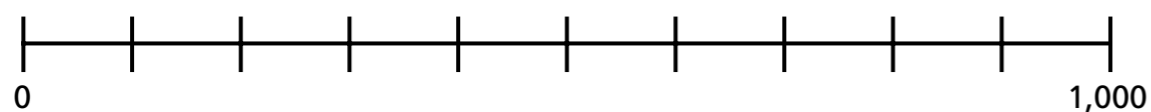**1** Rosie is working out the value of each of the intervals on this number line.

0 ————————— 100

There are 4 little marks, so you need to do 100 ÷ 4, which is 25. So the number line is going up in 25s.

Is Rosie correct? _____

Explain your answer.

_____

_____

2 Amir thinks this number line goes up in 10s.
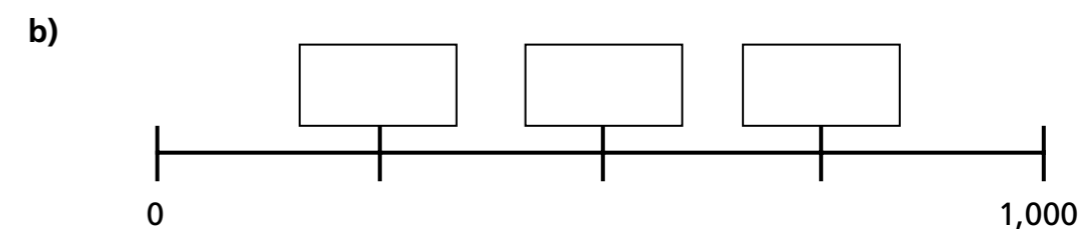
0 ————————— 1,000

Explain why Amir is incorrect.
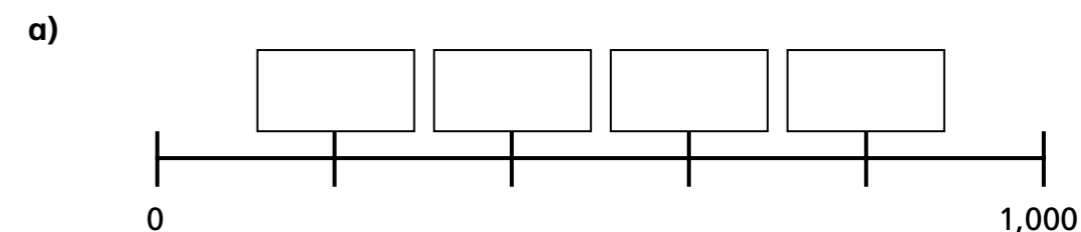
What does the number line go up in?
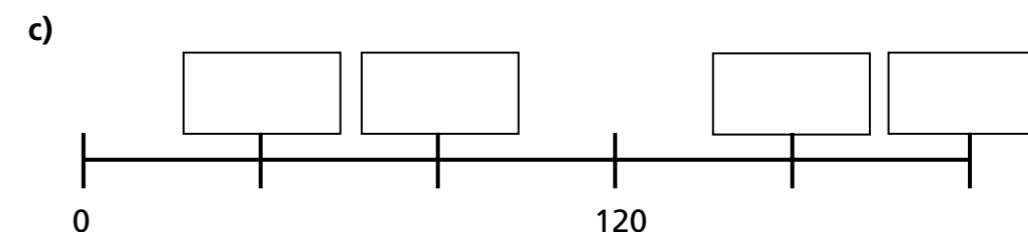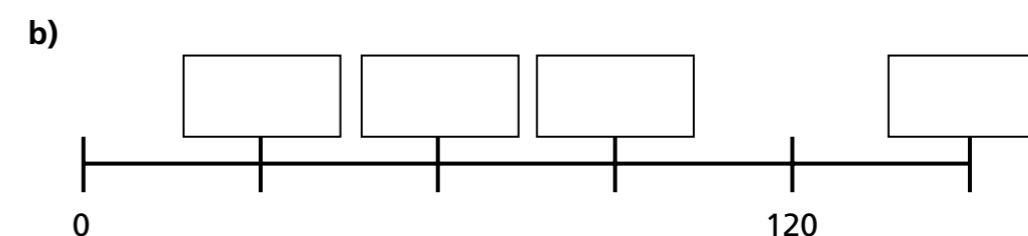
Label the intervals on the number line.

3 Draw a number line from 0 to 10,000 that goes up in 2,000s.
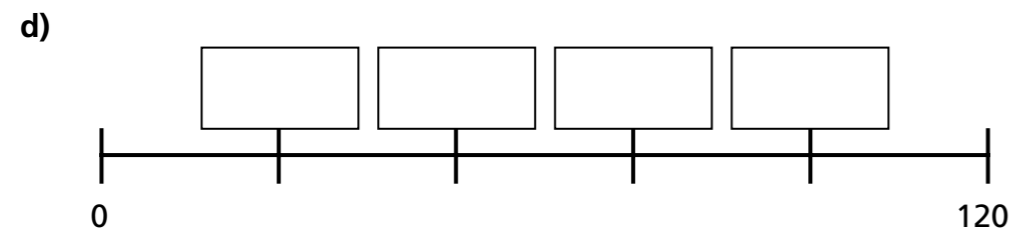
4 Complete the number lines.

a)

0 ————————— 1,000

b)

0 ————————— 1,000

5 Label the number lines.

a)

0 ———— 120 ————

b)

0 ———————— 120 ——

c)

0 ———————— 120 ——

d)

0   120
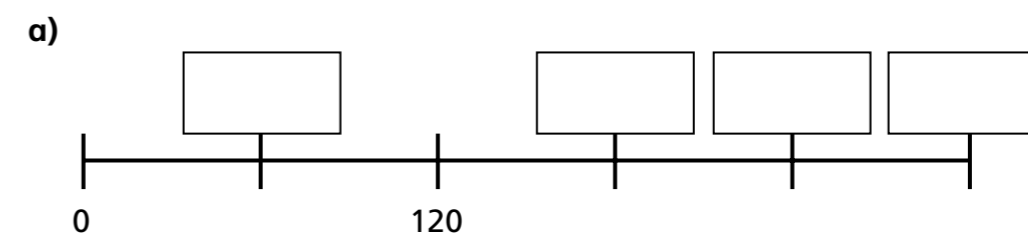
What would change if 120 were changed to 60?

What would stay the same? What would be different?

6 Work out the missing numbers.

a)

0   300   900

b)

0   65
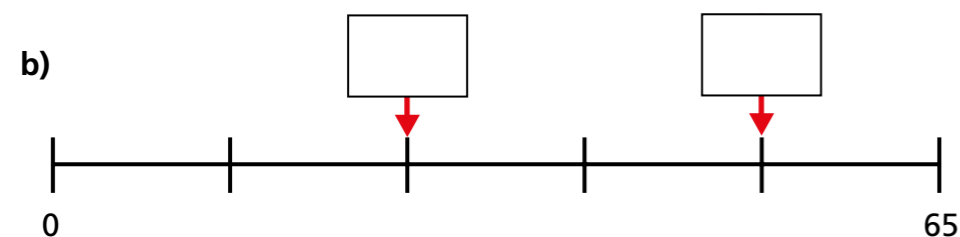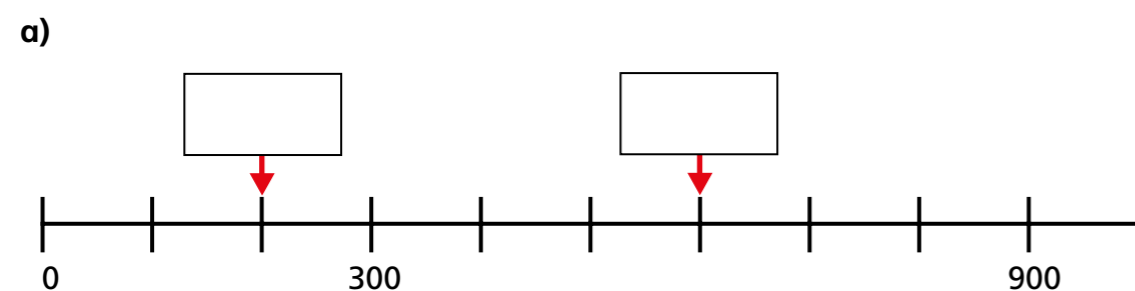
7 Find the difference between A and B.

A   B

0   25   35
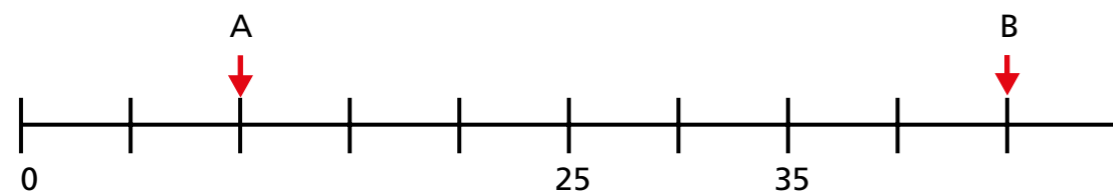
Show all the steps in your working.

The difference between A and B is

8 Here is a number line.

                         200   400
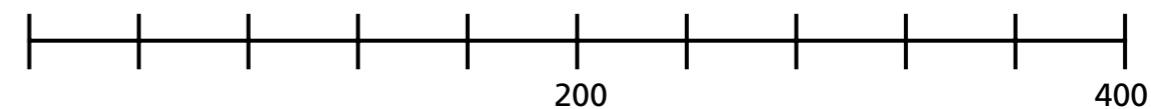
What is the number line going up in?

How do you know?

9 Work out the values of X, Y and Z.

a)

X

                      1,600   2,800

X =

b)

Y

40,000   50,000

Y =

c)

Z

                     250,000   251,500
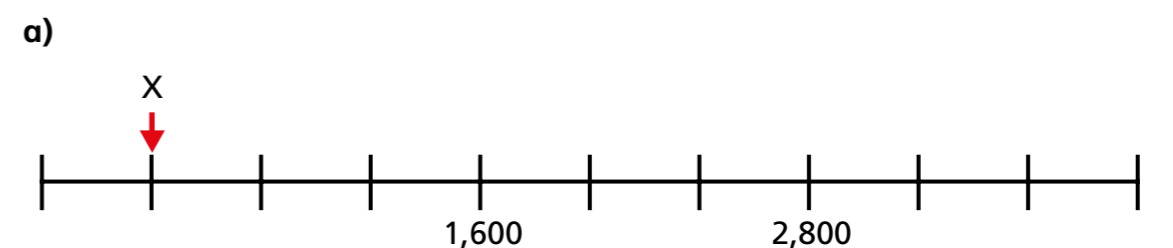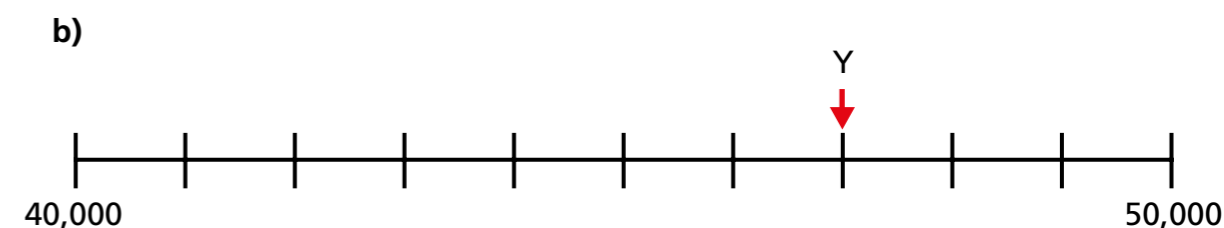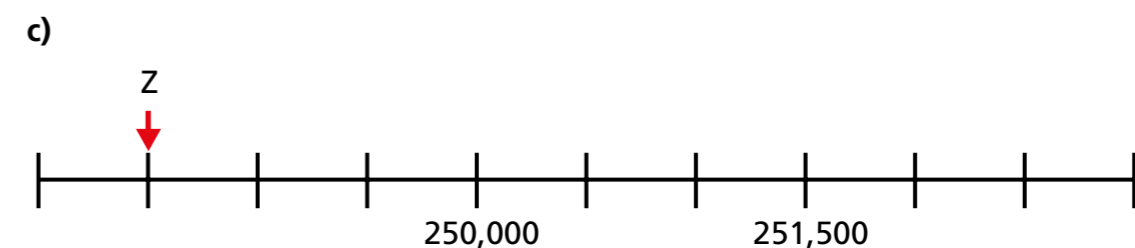
Z =

Round integers to the nearest power of ten

1 Complete the sentences.

a) 57 rounded to the nearest 10 is [ ]

257 rounded to the nearest 10 is [ ]

657 rounded to the nearest 10 is [ ]

1,157 rounded to the nearest 10 is [ ]

230,457 rounded to the nearest 10 is [ ]

b) 1,183 rounded to the nearest 10 is [ ]

1,184 rounded to the nearest 10 is [ ]

1,185 rounded to the nearest 10 is [ ]

1,186 rounded to the nearest 10 is [ ]

2 Mo is rounding 1,288 to the nearest 100

I looked at the hundreds and there are 2 hundreds. This is less than 5, so I will keep it.

So 1,288 rounded to the nearest 100 is 1,200

What mistake has Mo made? What should he have done?

_____

_____

_____

3 Round these numbers to the nearest 100

a) 729 [ ]   **d)** 11,872 [ ]

b) 1,705 [ ]   **e)** 9,975 [ ]

c) 7,650 [ ]   **f)** 45 [ ]

4 The number of people at a concert rounded to the nearest 100 is 15,600

a) How many people could have been at the concert?
Circle all the possible numbers.

15,580   15,492   15,658   15,642

b) What is the greatest number of people that could have been at the concert?

[ ]

Explain your answer.

_____

_____

5 Aisha rounds an integer. Her answer is 7,000

Aisha must have rounded her number to the nearest 1,000

Aisha could have rounded to the nearest 10, 100 or 1,000

Rosie

Mo

Who is correct? _____
Give reasons for your answer.

_____

_____

6 **a)** Complete the table.

Number	Rounded to the nearest 10,000	Rounded to the nearest 1,000	Rounded to the nearest 100
36,892			
81,055			
7,908			
126,388			

b) Here is some information about another number.

Number	Rounded to the nearest 10,000	Rounded to the nearest 1,000	Rounded to the nearest 100
	20,000	17,000	17,300

What could the number be?

Give five possible examples.

_____

_____

7 Here are some digit cards.

2	9	5	0	4

Use all the digits to make a number that will round to:

● 43,000 to the nearest 1,000

● 95,200 to the nearest 10

● 50,000 to the nearest 10,000

Compare answers with a partner.

8 Here is an article from a newspaper.

Rhinos Face Extinction

There are only 30,000 rhinos left in the wild in the world.
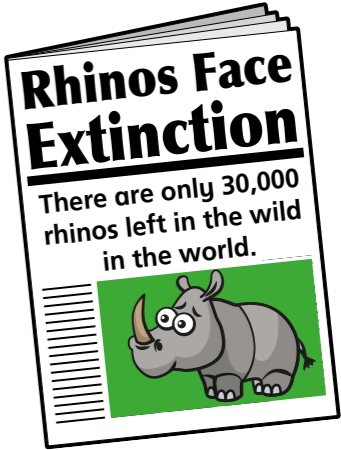
a) Do you think there are exactly 30,000 rhinos left in the wild?

Give reasons for your answer.

b) What is the greatest possible number of rhinos?

c) What is the least possible number of rhinos?

d) Compare your answers to part b) and c) with a partner.

9 These are the weights of 5 boxes rounded to the nearest 10 kg.

40 kg	50 kg	30 kg	40 kg	50 kg
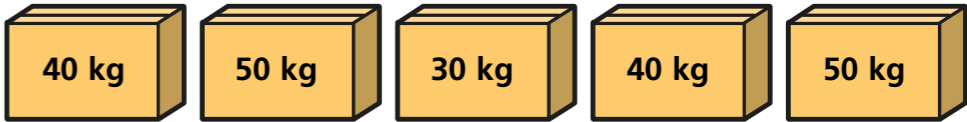
The boxes need to be put on a pulley lift to transport them to the top floor of a building.

The maximum load of the lift is 225 kg.

Is it safe to transport all 5 boxes at once? _____

Explain your reasoning.

_____

_____

Compare two numbers using =, ≠, <, >

1 Complete the statements using the correct phrase.

is greater than	is equal to
is not equal to	is less than

a) 502 > 52

502 _____ 52

52 _____ 502

b) 30,099 < 90,003

30,099 _____ 90,003

90,003 _____ 30,099

c) 76,590 ≠ 75,609

76,590 _____ 75,609

75,609 _____ 76,590

2 Write < or > to complete the statements.

a) 978 ◯ 1,111

b) 3,500 m ◯ 3,000 m

c) 945 ◯ 799

d) £50,000 ◯ £9,000

e) 500,070 ◯ 70,005

f) 7,000 ◯ Seventy thousand

g) 3.1 million ◯ 3,000,000

h) 20,003 g ◯ 20,030 kg

3 Tick the greatest number in each pair.

a)

HM	TM	M	HTh	TTh	Th	H	T	O

HM	TM	M	HTh	TTh	Th	H	T	O

b)

HM	TM	M	HTh	TTh	Th	H	T	O

HM	TM	M	HTh	TTh	Th	H	T	O

4 Write = or ≠ to complete the statements.

a) eight hundred and twenty million ◯ 82,000,000

b) 400,000 ◯ four hundred thousand

c) 50,000,000 ◯ half a billion

d) seven million and six thousand ◯ 706,000

5 Complete the part-whole models and write <, > or = to complete the statements.

a)

◯

◯ ◯

2,070   300   2,080   200

b)

◯

◯ ◯

half a billion   fifteen hundred   1,500   fifty million
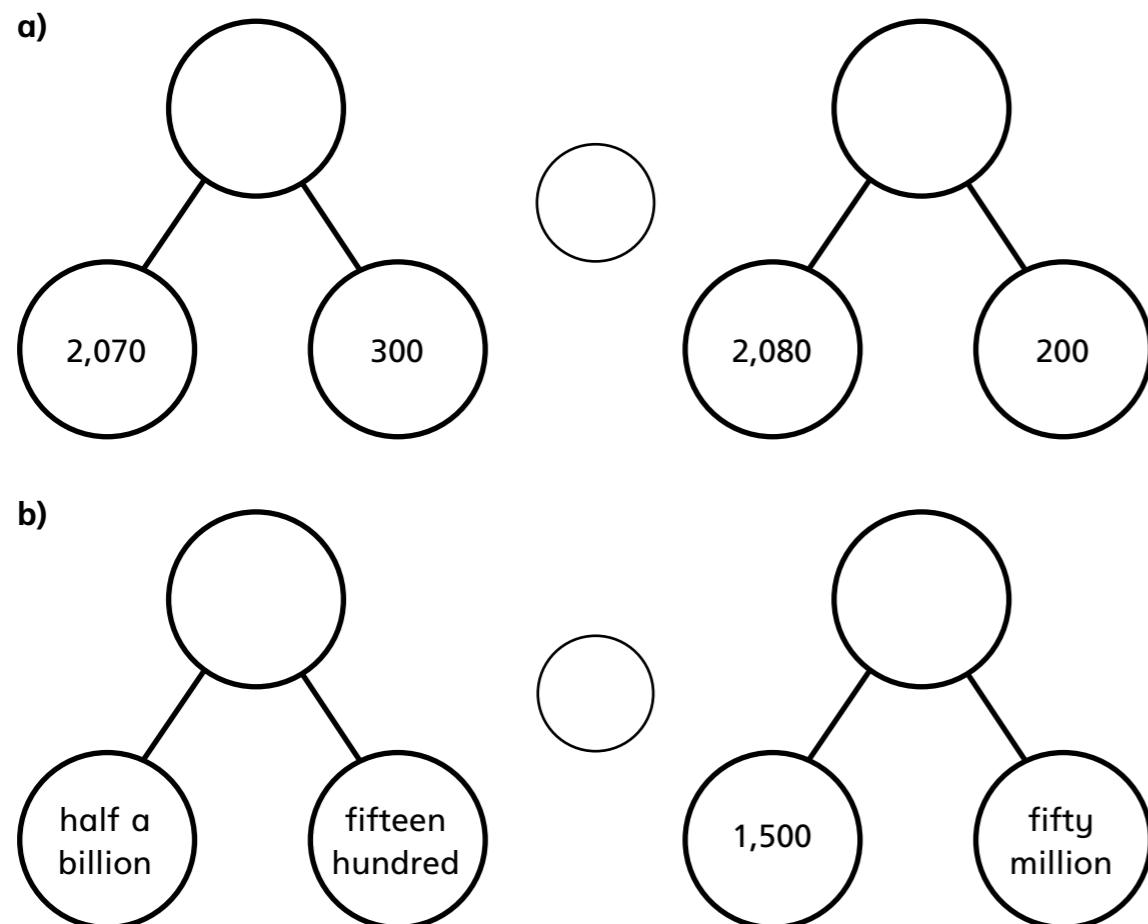
6 Fill in the missing digits to make the statements correct.

Give 2 possible answers for each one.

a) 7,__35 < 7,42__   7,__35 < 7,42__

b) 97__ > 9__8   97__ > 9__8

c) 3,8__9 < 3,__76   3,8__9 < 3,__76

7 Write five numbers that are less than 50,200 but greater than 50,180

_____

_____

8 Look at these inequality statements.

A < B   B < C

Which of the statements below are true and which are false?

Give a reason for each of your answers.

a) A < C

_____

_____

b) A could be equal to B

_____

_____

c) B lies between A and C

_____

_____

9 The digits 0 to 9 are each used once in this statement.

There are 5 missing digits.

48__ __9 < __ 6__ 7__

How many different solutions can you find?

Order a list of integers

1 Some numbers are listed in the place value table.

TTh	Th	H	T	O
2	0	7	0	9
3	7	9	0	0
2	7	9	0	3
2	0	3	0	7

a) Which is the greatest number?

b) How do you know that number is the greatest?

_____

_____

c) Write the numbers in descending order.

_____

2 Write the values in ascending order.

a) 13,000 kg   15,700 kg   12,995 kg   8,700 kg

_____

_____

b) 3 million   two hundred thousand   950,000   89,000

_____

_____

3 Look at the place value charts.

HM	TM	M	HTh	TTh	Th	H	T	O
●		●●	●●	●		●●		●●●
			●					●●●

☐

HM	TM	M	HTh	TTh	Th	H	T	O
	●●●●	●●●●●	●●●●		●		●●●	
		●					●●●●	

☐

HM	TM	M	HTh	TTh	Th	H	T	O
	●●●●	●●●●●	●●●●					
	●●	●	●					

☐
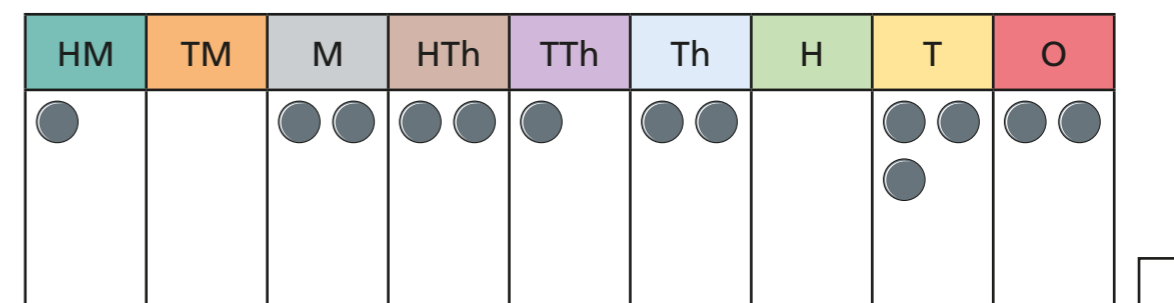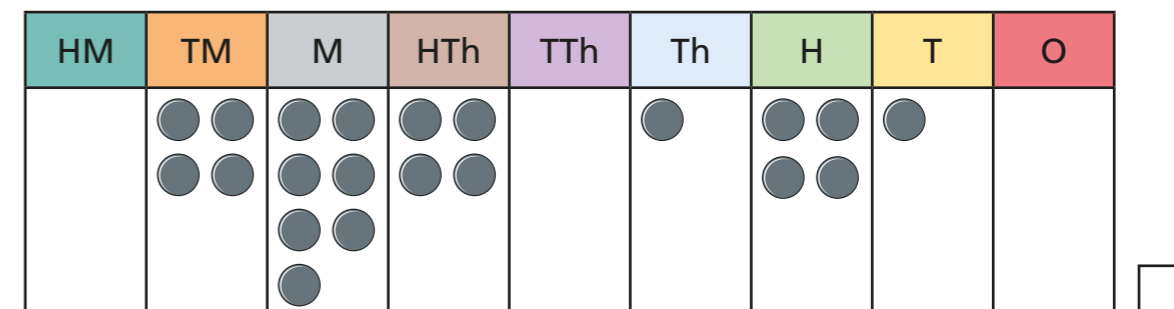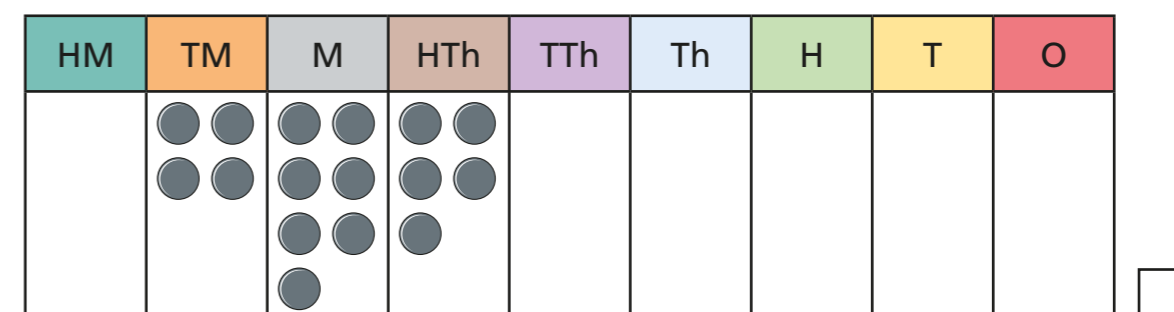
a) Which chart represents the greatest number?
Tick your answer.

b) How can you know this is the greatest number without working out what each number is?

_____

_____

c) Write the greatest number in figures.

d) Write the numbers in descending order.

_____

© White Rose Maths 2019

4 Whitney is writing some numbers in order, starting with the greatest.

She writes these numbers.

99,999   90,009   11,111   100,001

> 9 is greater than 1 and 0, so 99,999 must be greater than 100,001

Is Whitney correct? _____

Explain your answer.

_____

_____

5 Here are the transfer fees of four footballers.

Player	A	B	C	D
Transfer fee	£8.2 million	£8 million	£8.02 million	£81,000,000

a) Which player has the highest transfer fee? _____

b) Which player has the lowest transfer fee?_____

6 Write the missing digits to make the inequality statement correct.

5,10__ < 5,1__0 <__, __11 < __, __ __1

Is there more than one solution?

_____

7 The populations of the world's largest cities are listed in the table.

City	Country	Population
Tokyo	Japan	38 000 000
Delhi	India	25 700 000
Shanghai	China	23 700 000
Sao Paulo	Brazil	21 050 000
Mumbai	India	
Mexico City	Mexico	20 990 000

The population of Sao Paulo is expected to increase by 6 million by 2050

The population of Shanghai is expected to increase by 3 million by 2050

a) Is there expected to be more people in Sao Paulo or Shanghai by 2050?

_____

b) The population of Mumbai in India is in 5th position.

What could be the population of Mumbai?

How many possible answers are there?

8 Put one digit in each box so that the numbers are ordered from smallest to greatest from top to bottom.

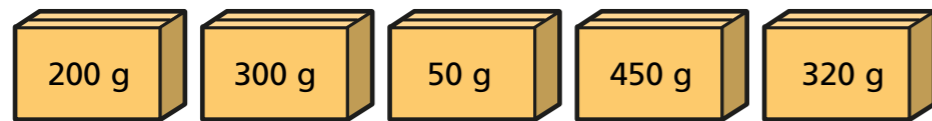| HM	TM	M	HTh	TTh	Th	H	T	O
0		0		5	4	0	1	0
	7	2		9	6	2	3	2
	8		1				1	
1	2		5		8		4	
1	2	0	5	0	8	0		4

Is there more than one solution?

Find the range of a set of numbers

1 Here are the weights of 5 boxes.

| 200 g | 300 g | 50 g | 450 g | 320 g |

a) Eva thinks that the range of the weights is 320 g – 200 g = 120 g.

What mistake has Eva made?

_____

_____

b) What is the range of weights?

2 Work out the range of each set of numbers.

a) 6, 8, 2, 1, 6, 4, 3, 1

b) £15, £17, £28, £27, £28, £21

c) 839 m, 900 m, 839 m, 903 m, 983 m

d) 56, 65, 0, 56

3 The table shows the average amount of water used on some everyday activities.

Everyday activity	Average amount of water used
having a bath	100 litres
flushing the toilet	6 litres
filling a kettle	2 litres
using a dishwasher	15 litres
using a washing machine	60 litres

What is the range of the average amount of water used?

4 Work out the range of these numbers.

| twenty-five thousand seven hundred and six | two hundred and fifty thousand and seventy-six |

| 257,006 | 2,500,760 |

| 205,706 |

5 The range of each set of cards is 9

What could the value of the blank cards be?

a)

2	8	7		3

b)

15	18	20	17		

c)

120			

d) Which parts could have more than one answer?

6 The range of a set of numbers is 57

The smallest number is 268

a) What is the greatest number?

b) If 268 was the greatest number, what would the smallest number be?

7 These are the number of goals scored by a team in their first 5 matches.

3   2   2   1   4

The team play another match, and the range increases to 4

How many goals could have been scored in the 6th match?

8 Here are the times that 5 students took to complete a puzzle.

3 minutes   220 seconds   2.5 minutes

1 minute and 15 seconds   125 seconds

What is the range of the times?

9 Annie is working out the range of these amounts.

4 l	3 l	200 ml	2.5 l	500 ml

The range is 497.5

Annie is incorrect.

a) Explain the mistake she has made.

_____

_____

b) What is the range of the amounts?

Find the median of a set of numbers

1 Eva makes some towers from cubes.
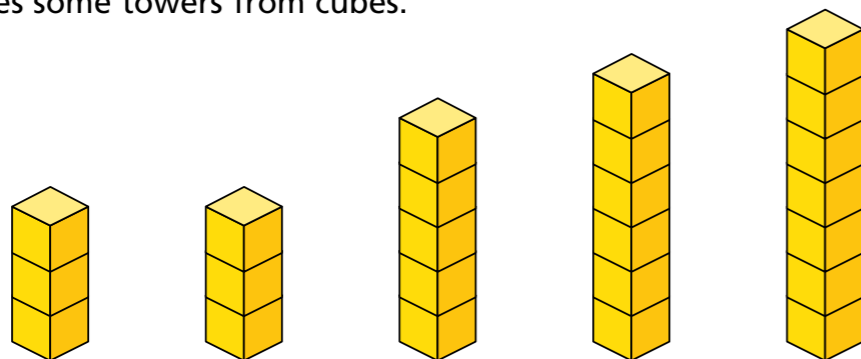
a) Circle the median tower of cubes.

Explain your answer.

_____

_____

Amir also makes some towers from cubes.
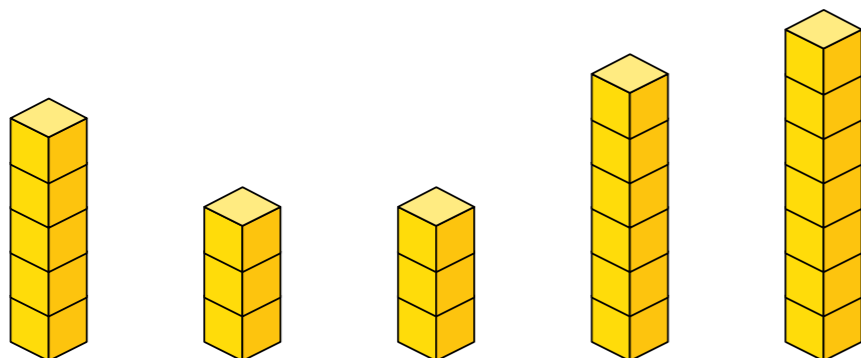
b) Circle the median tower of cubes.

Explain your answer.

_____

_____

2 Work out the median for each of these sets of numbers.

a) 4, 9, 1, 2, 12

median = [   ]

b) 21 cm, 26 cm, 24 cm, 30 cm, 26 cm, 33 cm

median = [   ]

c) £20, £14, £18, £16

median = [   ]

d) 340 g, 480 g, 260 g, 350 g, 210 g, 500 g

median = [   ]

3 Here are the test results from a group of Year 7 students.
56%, 42%, 81%, 68%, 61%, 68%, 87%, 39%, 42%
Work out the median result.

median = [   ]

4 Five numbers have a median of 8

☐ ☐ ☐ ☐ ☐

a) Fill in the cards to show what the numbers could be.

b) Compare answers with a partner.

What is the same and what is different?

5 Work out the missing numbers.

a) The median of these numbers is 12

5	**10**		**23**

b) The median of these weights is 48 kg.

32 kg	**39 kg**		**54 kg**	**68 kg**	**300 kg**

6 Four numbers have a median of 10 and a range of 4

Write the 4 numbers.

☐ ☐ ☐ ☐

Is there more than one possible solution?

7 The amount of liquid in each container is shown on the labels.

Work out the median amount of liquid.
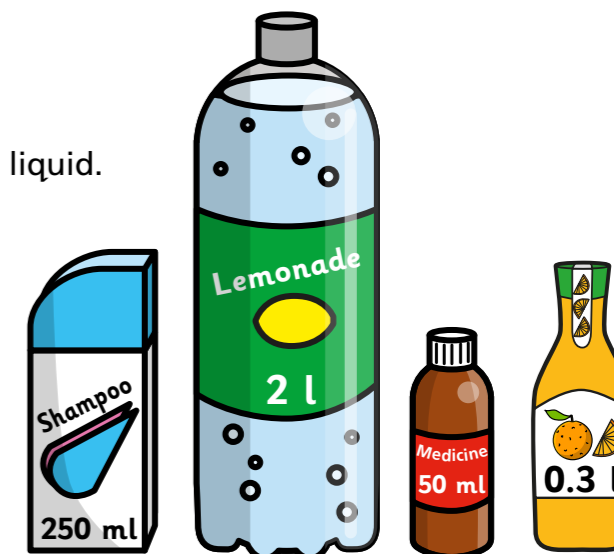
Median = ☐

8 Ron works out the median amount of time that students in his class spend on homework in a week.

> The median is 1 hour 45 minutes.

Another student says she spends 2 hours a week on homework.

What could happen to the median?

_____

_____

9 The median wage of employees at a company is £570 per week.

84 employees work for the company.

2 of the employees earn exactly £570 per week.

How many people earn more than £570 per week?

☐

Understand place value for decimals

1 Some numbers have been made on place value charts.

Complete the sentences.

a)

Ones	Tenths	Hundredths
	0.1 0.1 0.1 0.1 0.1	0.01 0.01 0.01

0.53 is equal to [　] tenths and [　] hundredths.

0.53 = 0.__ + 0.0__

b)

Ones	Tenths	Hundredths
1 1 1 1 1	0.1 0.1	0.01 0.01 0.01 0.01 0.01 0.01 0.01

5.27 is equal to 5 _____, 2 _____ and [　] hundredths.

5.27 = 5 + [　].[　] + [　].[　][　]

2 What number is represented on the place value chart?

Ones	Tenths	Hundredths	Thousandths
1 1	0.1 0.1 0.1		0.001 0.001 0.001 0.001

[　]

3 Make these numbers on a place value chart.

0.7   0.75   1.75   1.85   1.853

4 Draw counters to represent the numbers.

Write the value of the 5 and the 2 in each number.

a) 0.52

Tens	Ones	Tenths	Hundredths

_____

b) 5.2

Tens	Ones	Tenths	Hundredths

_____

c) 50.02

Tens	Ones	Tenths	Hundredths

_____

© White Rose Maths 2019

5 Complete the part-whole models.

a)

0.58

0.5 ◯

c)

◯

0.05 0.7

b)

1.5

◯ ◯

d)

◯

0.6 0.035
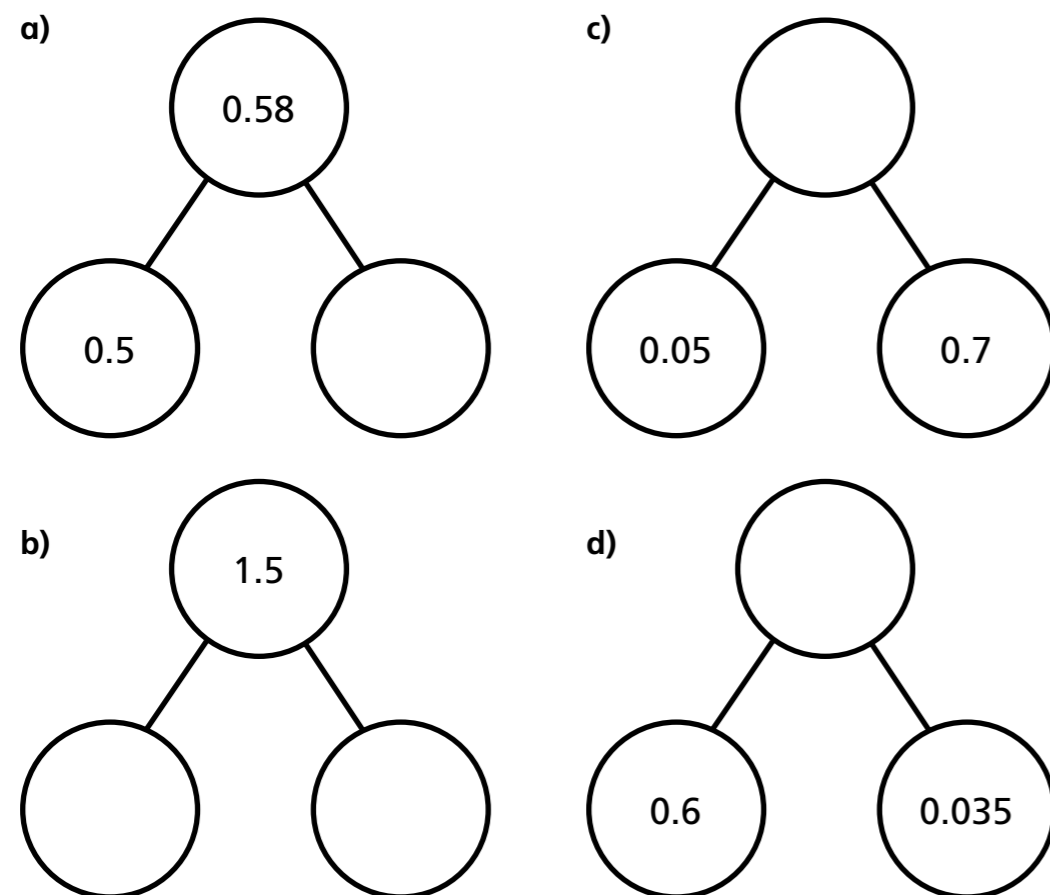
What is the value of the 5 in each number?

How does the part-whole model help?

6 Dora has made this number.

0.1   0.01 0.01 0.01 0.01 0.01 0.01 0.01

Dora wants to make the number 2.38

Circle the counters that Dora needs to add.

1   1   0.1   0.1   0.01 0.01

1   1   0.1   0.1   0.01 0.01

7

| 5 | 0.5 | 0.05 |

Which number is represented by the bar model?

Circle the correct answer.

55.5   55.05   5.55   5.055

8 Complete the number sentences.

a) 5 tens + 3 _____ + 6 tenths + 2 _____ = __3.__2

b) ☐ hundreds + ☐ ones + ☐ _____ = 902.4

c) 7 tens + 3 ones + 9 hundredths = ☐☐.☐☐

d) 2 tenths + 8 hundredths = ☐.☐☐

9 Jack thinks 45 hundredths is the same as 0.45

Kim thinks Jack is wrong because 0.45 has only 5 hundredths.
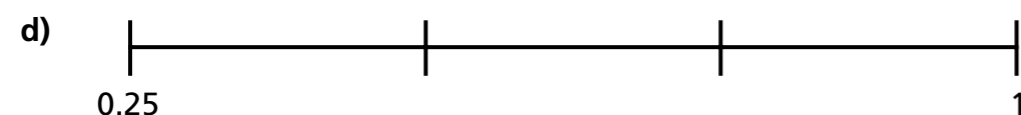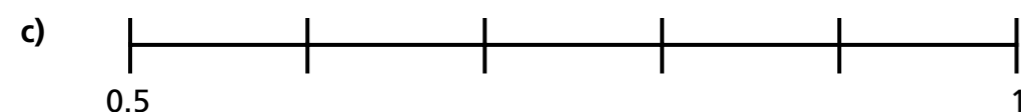
Who is correct? _____

Give reasons for your answer.

_____

_____

Position decimals on a number line

1 Label the number lines.

a)

```
0                             1
```

b)

```
0                                                    1
```

c)

```
0.5                                                  1
```

d)

```
0.25                                                 1
```
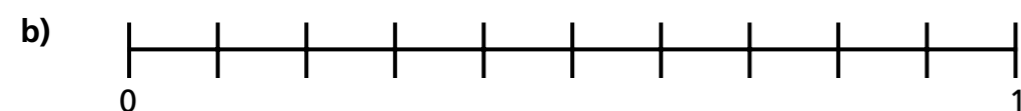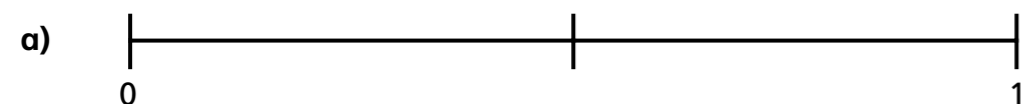
2 What numbers are the arrows pointing to?

```
0        1        2
```
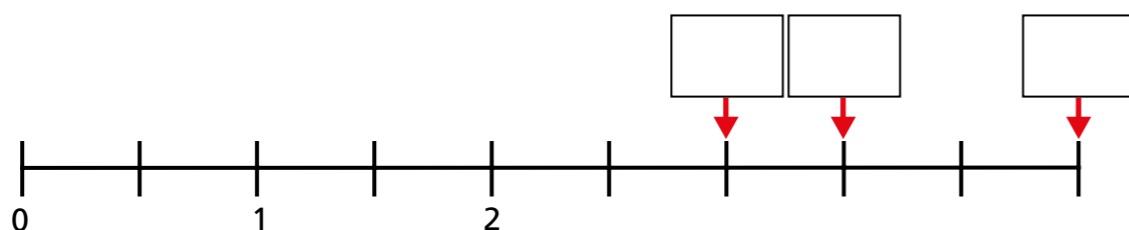
3 What numbers are the arrows pointing to?

a)

```
0                                          10
```

b)

```
7                                          8
```

c)

```
2.5                                        2.6
```
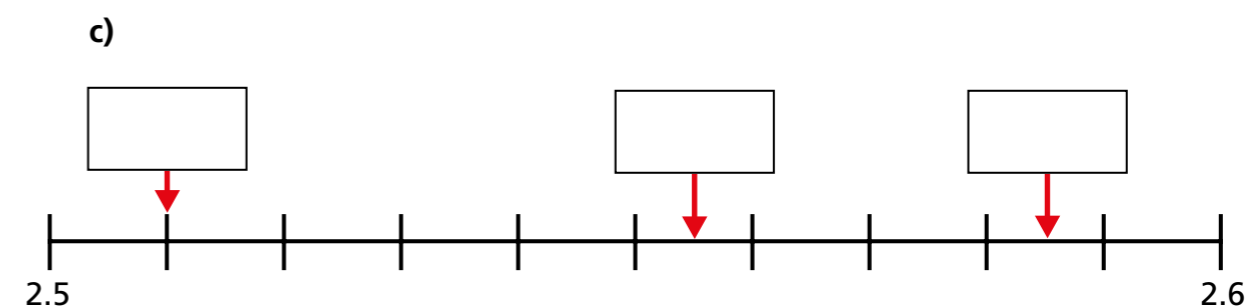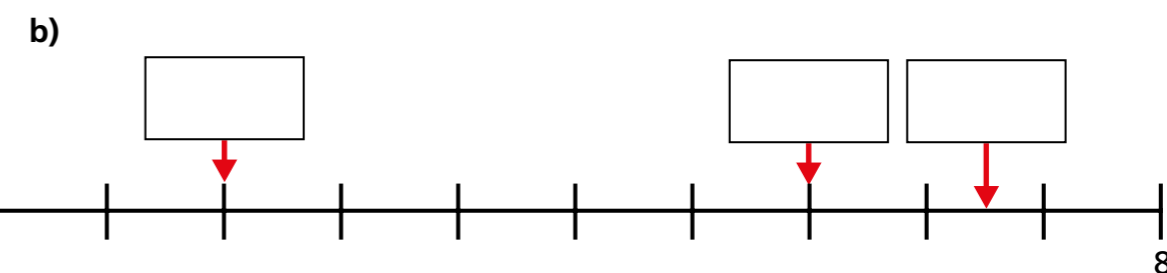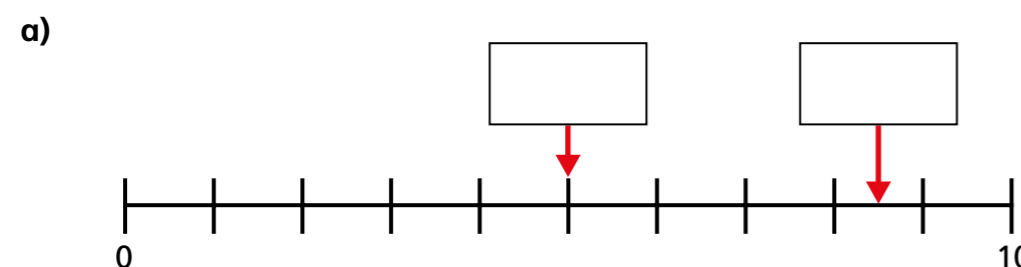
4 Kim thinks the arrow is pointing to 4.2

```
4                     5                     6
```

Is Kim correct? _____

Explain your answer.

_____

_____

5 What does each interval on the number line represent?

```
10                                         11
```
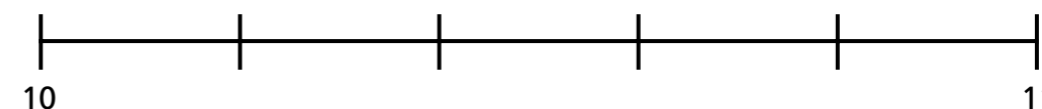
Each interval on the number line represents

6 The bar chart shows the rainfall in a city for the first four months of the year.
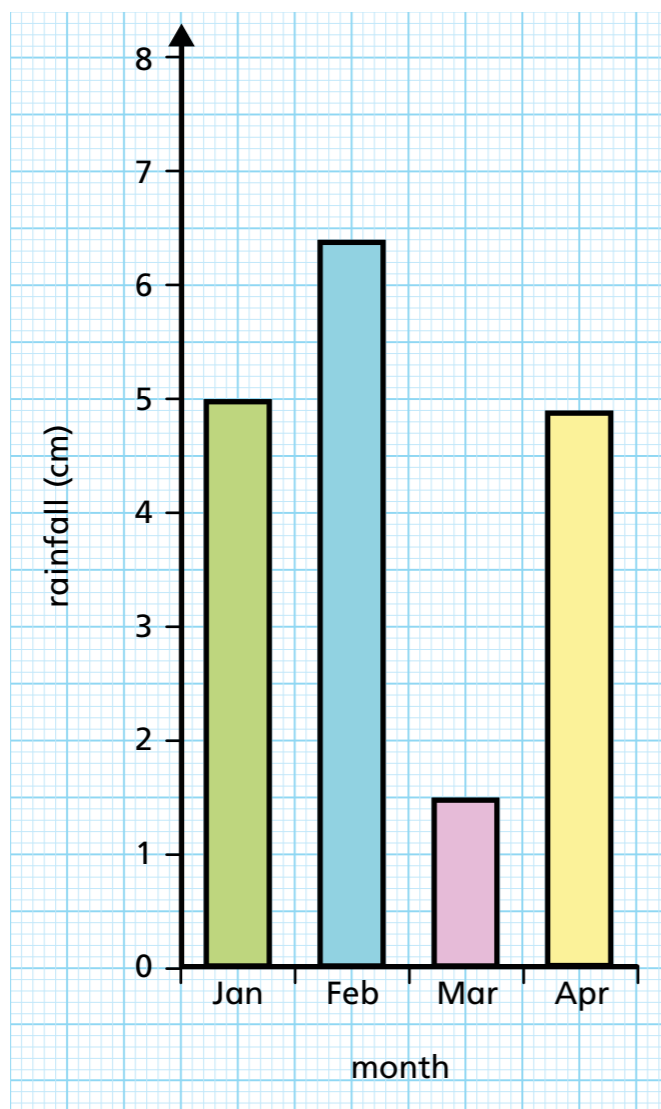
Complete the table.

Month	Jan	Feb	Mar	Apr
Rainfall (cm)				

7 Label the number line.
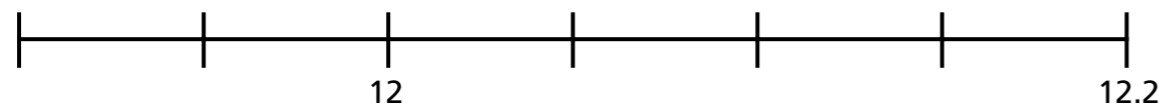
8 Label the number 2 on each number line.

a)

b)

c)

d)
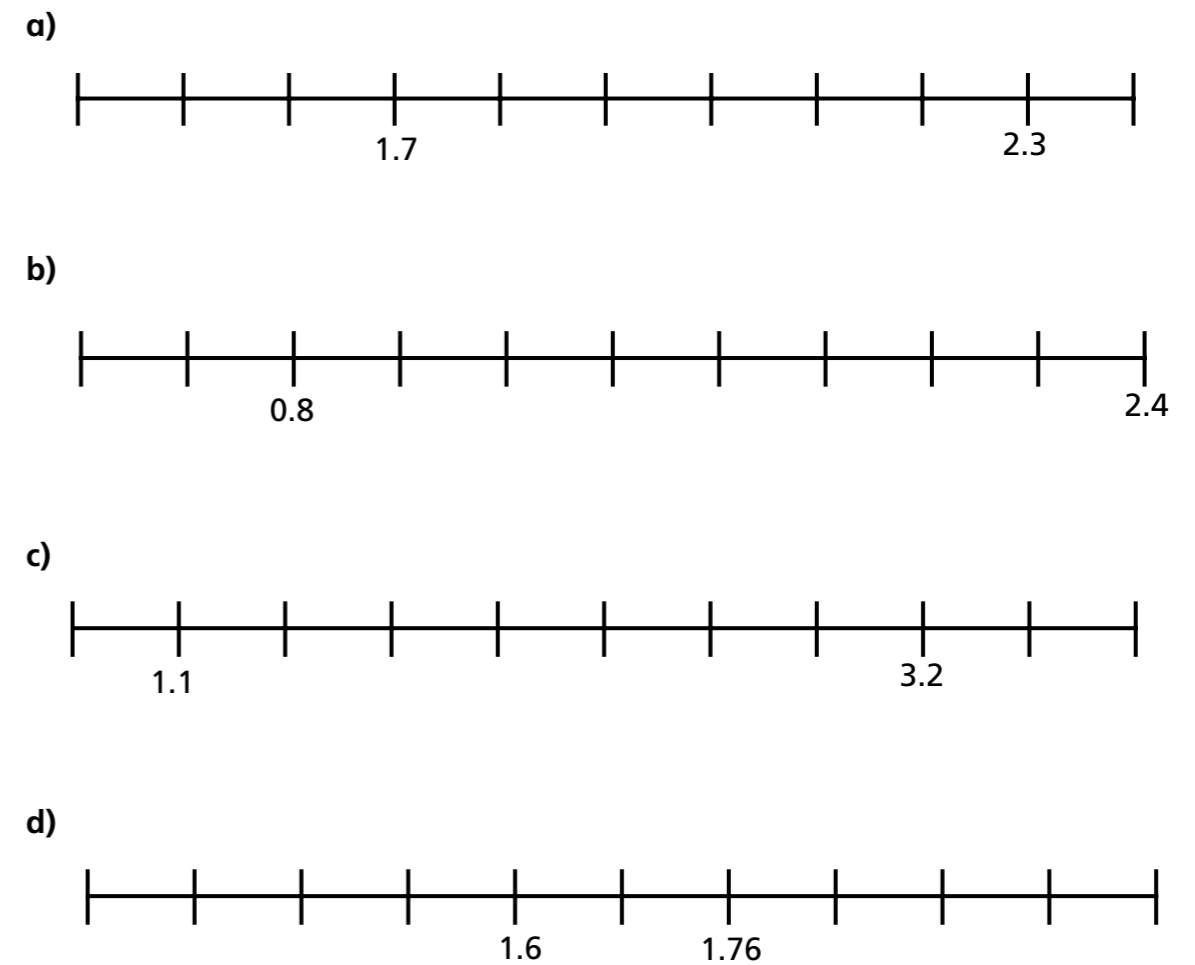
9 What could the end points be on this number line?
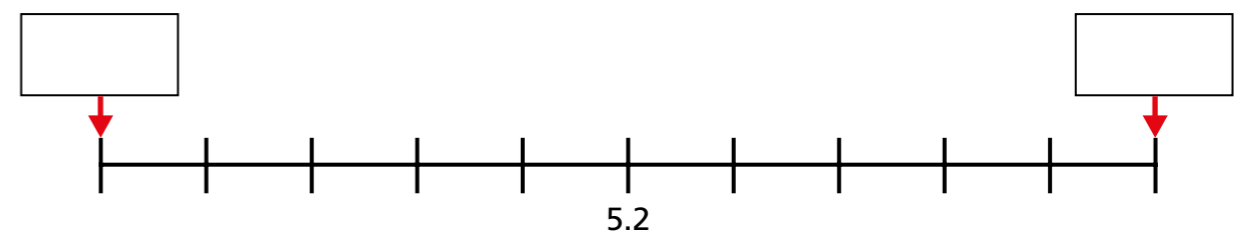
How many solutions can you find?

Compare answers with a partner.

Compare and order any number up to one billion

1 Mo and Rosie each use 8 counters to make a number on a place value chart.

O	Tth	Hth
1 1 1	0.1 0.1 0.1 0.1	0.01

Mo

O	Tth	Hth
1 1 1 1 1	0.1 0.1 0.1	

Rosie

Who has made the greatest number? _____

Explain how you know.

_____

_____

2 Write < or > to compare the numbers.

a)

T	O	Tth
10	1 1 1	0.1 0.1 0.1 0.1 0.1

◯

T	O	Tth
10	1 1 1 1 1 1	0.1

b)

O	Tth	Hth
	0.1 0.1 0.1 0.1 0.1 0.1	0.01 0.01

◯

O	Tth	Hth
		0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01

c) 1.43 ◯ 1.34

d) 30.14 ◯ 31.4

3 Ron is comparing numbers.

> 5.3 is less than 5.18 as 3 is less than 18

Is Ron correct? _____

Explain your answer.

_____

_____

4 **a)** Write these numbers on the place value chart.

10.02   20.2   0.21   10.1   2.01   0.12

Tens	Ones	Tenths	Hundredths

b) Write the numbers in ascending order.

_____

5 Write <, > or = to complete the statements.

a) 18.2 ◯ 18.09   **b)** 1.25 ◯ 12.5

c) 0.07 ◯ 0.7   **d)** 310.46 ◯ 3104.6

e) 0.5 ◯ five tenths

f) two ones and three hundredths ◯ three ones and two hundredths

g) six tenths ◯ sixty hundredths

h) eight ones, nine tenths and one hundredth ◯ eight ones and nine hundredths

6 The weights of three dogs are shown.
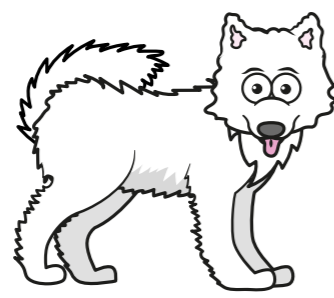
20.37 kg   20.73 kg   20.7 kg

a) Write the weights in descending order.

_____

b) A fourth dog is weighed.

This dog is the second heaviest of all the dogs.

What could the weight of this dog be?

_____

Is there more than one answer?

7 Write the numbers in ascending order.

a) 4.5   45   0.45   0.504

_____

b) 130.9 km   135 km   1,039.5 km   132.5 km

_____

8 Circle all the values that are less than four-tenths.

0.37   0.45   8 tenths   1.1   0.099

9 Write the missing digits to make the statements correct.

a) 5.8 > 5.__8   **b)** 3__.__ < 32.64

5.8 < 5.__8   3__.__ > 32.64

How many answers can you find for each?

10 Fill in the missing digits so that the numbers are in ascending order.

0.9__   0.__8   1.__   __.1__   1.__2

How many answers can you find?

_____

_____

Compare answers with a partner.

Round a number to 1 significant figure

1 Some numbers are written in a table.

Underline the first significant figure in each of the numbers.

Then complete the other columns.

The first one has been done for you.

Number	Place value of 1st significant figure	Number rounded to 1 significant figure
<u>7</u>3	Tens	70
730		
758		
7,300		
7,780		
704,000		
7.9		
0.71		

2 Round the numbers to 1 significant figure.

a) 328

b) 1,719

c) 1,219

d) 83

e) 89.6

f) 83.67

g) 9.84

h) 96.9

3 Alex rounds 459 to 1 significant figure.
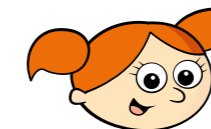
> This is 500 to 1 significant figure.

Alex

a) Is Alex correct? _____

Explain why.

_____

_____

b)

> Rounding to 1 significant figure is always the same as rounding to the nearest 100

Ron

Is Ron correct? _____

Talk about it with a partner.

4 Which of these numbers could have been rounded to 1 significant figure?

Tick your answers.

80.08	☐	800	☐
8	☐	0.8	☐
80	☐	8.08	☐
808	☐	0.08	☐
0.80	☐	0.0008	☐

What do you notice about your answers?

5 Dora is rounding numbers to 1 significant figure.

0.086 rounds to 0.1 as 8 is greater than 5, so the 0 goes up to a 1

Explain the mistake that Dora has made and write the correct answer.

_____

_____

6 Round the numbers to 1 significant figure.

a) 0.0451 [ ]

0.451 [ ]

0.000451 [ ]

b) 0.0000662 [ ]

0.0002662 [ ]

2.000662 [ ]

7 Tommy rounds 0.003872 to 1 significant figure.

0.004000

How could Tommy improve his answer?

_____

_____

8 Mo is rounding answers on his calculator to 1 significant figure.

99.4938

a) Mo says the answer is 99

Explain the mistake that Mo has made and write the correct answer.

_____

_____

b) Work out $\frac{(6.7 + 2.3)}{9.6}$ on your calculator. [ ]

Round the answer to 1 significant figure. [ ]

9 The attendance at a football match is 28,765

a) Round this number to 1 significant figure.

[ ]

The number of people who attend a different football match is 60,000 rounded to 1 significant figure.

b) What is the greatest possible number of people who attended the football match?

[ ]

c) What is the least possible number of people who attended the football match?

[ ]

10 When does rounding to 1 significant figure give the same answer as rounding to the nearest 10?

Talk about it with a partner and come up with a generalisation.

Write 10, 100, 1,000 etc. as powers of ten (H)

1 Complete the statements.

a) $2^3 = $ ☐ $\times$ ☐ $\times$ ☐

b) $5^6 = $ ☐ $\times$ ☐ $\times$ ☐ $\times$ ☐ $\times$ ☐ $\times$ ☐

c) $3^5 = $ _____

d) $6 \times 6 = 6^{☐}$ e) $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 = ☐^{☐}$

2 Write these numbers in the form 10^n

a) $100 = 10 \times 10 = 10^{☐}$

b) $1,000 = $ _____ $= 10^{☐}$

c) $100,000 = $ _____ $= ☐^{☐}$

d) $10 = ☐^{☐}$

e) $100,000,000 = ☐^{☐}$

3 Eva writes 10^5 as 1000000

> 10^5 has a power of 5, so you need to write 10 and 5 extra zeros.
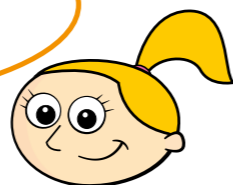
Is Eva correct? _____

Explain your answer.

4 Write these powers of 10 as ordinary numbers.

a) $10^2 = $ ☐   c) $10^9 = $ ☐

b) $10^4 = $ ☐   d) $10^{12} = $ ☐

Explain how you worked out the answers.

Did you use the same method for each question?

_____

_____

_____

5 Match the powers of 10 to the numbers.

10^8	10
10^1	10,000
10^6	1
10^4	100,000,000
10^0	1,000,000

6 What is the value of the 1 in each number?

a) 10^7 _____

b) 10^3 _____

c) 10^9 _____

7 Write these numbers in ascending order.

10^4		One hundred thousand
One billion	10^3	
$1,000^2$	Ten million	One hundred

_____

_____

Talk about your method with a partner.

8 Here is the definition of a quadrillion.

> **quadrillion:** number formed by writing 1 followed by fifteen zeros

Write a quadrillion as a power of 10

_____

9 A trillion can be written as 10^{12}

Write a trillion as an ordinary number. _____

10 Use the table to help you answer the questions.

quintillion	10^{18}
sextillion	10^{21}
septillion	10^{24}
octillion	10^{27}

a) How many times greater than a million is a quintillion? _____

b) How many times greater is an octillion than a septillion? _____

11 a) Write $10^3 \times 10^2$ as a single power of 10 _____

b) Explain your method.

_____

_____

c) Tick the statements that are correct.

| $10^3 \times 10^2 = 10^6$ ☐ | $10^5 \times 10^3 = 10^8$ ☐ | $10^7 \times 10 = 10^7$ ☐ |

| $10 \times 10^4 = 10^5$ ☐ | $10^5 \times 10^5 = 10^{25}$ ☐ | $10^4 \times 10^2 \times 10^3 = 10^9$ ☐ |

d) The answer is 10^8

What is the question?

Write positive integers in the form $A \times 10^n$

H

1 Complete the statements and then continue the pattern.

a) $30 = 3 \times \boxed{}$

b) $300 = 3 \times 10 \times \boxed{} = 3 \times 10^{\boxed{}}$

c) $3{,}000 = 3 \times 10 \times 10 \times \boxed{} = 3 \times 10^{\boxed{}}$

d) $30{,}000 = $ _____

e) $300{,}000 = $ _____

f) $3{,}000{,}000 = $ _____

2 Sort these values into the correct columns of the table.

7×10^6 $50{,}000$ 8×10^3

15×10^8 6×10 5×8^{10}

Numbers written in standard form	Numbers not written in standard form

Write two more numbers in each column.

3 Find the missing number so that these numbers are written in standard form.

a) $800 = \boxed{} \times 10^2$

c) $20 = \boxed{} \times 10$

b) $7{,}000{,}000 = \boxed{} \times 10^6$

d) five million $= \boxed{} \times 10^6$

4 Write the missing power so that these numbers are written in standard form.

a) $5{,}000 = 5 \times 10^{\boxed{}}$

c) $4{,}000{,}000{,}000 = 4 \times 10^{\boxed{}}$

b) $100{,}000 = 1 \times 10^{\boxed{}}$

d) Seven billion $= 7 \times 10^{\boxed{}}$

5 Write these as ordinary numbers.

a) $8 \times 10^6 = $ _____

b) $1 \times 10^8 = $ _____

c) $9 \times 10^5 = $ _____

6 Write these numbers in standard form.

a) $900 = $ _____

b) $30{,}000{,}000 = $ _____

c) $60 = $ _____

d) fifty thousand $= $ _____

e) $40{,}000 \times 10 = $ _____

f) $1{,}000 \times 7{,}000 = $ _____

g) $200 \times 300 = $ _____
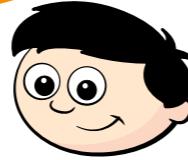
7

Eva: 4 x 10^7 is smaller than 6 x 10^5 because 4 is smaller than 6
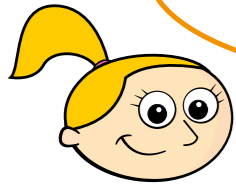
Dexter: I don't think you are correct. I think the powers are important.

Eva

Dexter

Who is correct? _____

Explain your answer.

_____

_____

8 Circle the greatest number.

4×10^6 7×10^4

Explain your answer.

_____

_____

9 Find the range of these numbers.

3×10^5 7×10^4 8×10^2 7×10^5

10 The table shows information about planets.

| | Radius (in metres) | | Mass (in kg) |
	Standard form	Ordinary form	Standard form
Mercury	2×10^6		3×10^{23}
Venus		6000000	5×10^{24}
Earth	7×10^6		6×10^{24}
Mars		3000000	6×10^{23}
Jupiter	7×10^7		2×10^{27}
Saturn	6×10^7		6×10^{26}
Uranus		30000000	9×10^{25}
Neptune	2×10^7		1×10^{22}

a) Complete the table.

b) Which planet has the greatest radius?

_____

c) Write the names of the planets in ascending order based on their mass.

_____

_____

d) Each of the numbers in the table has been rounded to 1 significant figure.

What is the smallest possible radius of Saturn?

Investigate negative powers of ten **H**

1   Complete the table.

Power of 10	Calculation	Answer
10^6	$10 \times 10 \times 10 \times 10 \times 10 \times 10$	1,000,000
10^5	$10 \times 10 \times 10 \times 10 \times 10$	
10^4		
10^3		
10^2		
10^1		
10^{-1}	$1 \div 10$	0.1
10^{-2}	$1 \div 10 \div 10$	
10^{-3}		
10^{-4}		
10^{-5}		

What patterns can you see?

_____

_____

_____

2   Write these numbers in the form 10^n

a)   0.0001 = _____

b)   0.1 = _____

c)   0.000 01 = _____

d)   0.000 001 = _____

e)   0.000 000 000 01 = _____

f)   one ten thousandth = _____

3   Write these powers of 10 as ordinary numbers.

a) 10^{-2} = [ ]

b) 10^{-5} = [ ]

c) 10^{-8} = [ ]

4

10^{-4} is greater than 10^2 as 4 is greater than 2

Is Whitney correct? _____

Explain your answer.

_____

_____

5   Write < or > to make these statements correct.

a) 10^{-2} ( ) 10^2 **e)** 10^{-7} ( ) 10

b) 10^7 ( ) 10^4 **f)** 10^5 ( ) 10^5

c) 10^{-8} ( ) 10^{-6} **g)** 10^{-14} ( ) 10^{-13}

d) 10^8 ( ) 10^6 **h)** 10^{-236} ( ) 10^1

6 What is the median of this set of numbers?

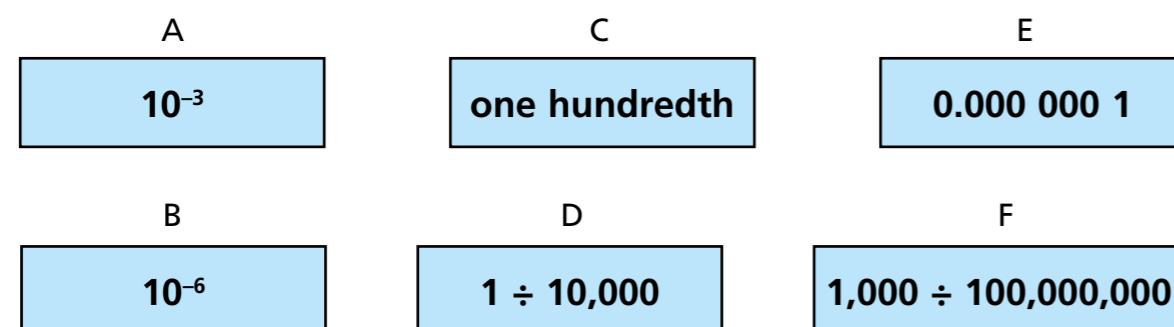| 10^3	10^{-3}	10^7	10^{13}	10^{-13}
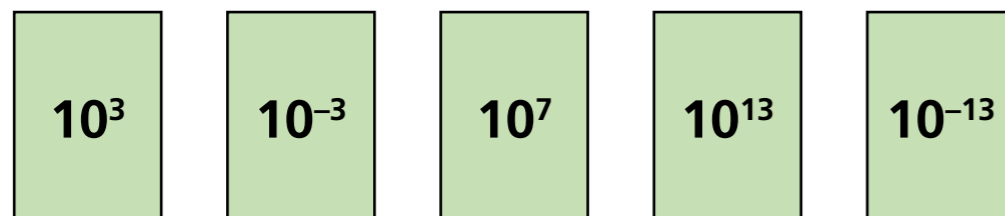
The median is [ ]

7 **a)** A millionth is the number formed by dividing 1 by a million.

Write a millionth as a power of 10

_____

b) A quintillionth can be written as 0.000000000000000001

Write a quintillionth as a power of 10

_____

8 Here are some number cards.

A	C	E
10^{-3}	one hundredth	0.000 000 1

B	D	F
10^{-6}	1 ÷ 10,000	1,000 ÷ 100,000,000

Put the number cards in ascending order.

_____

9 **a)** What is the value of 10 hundredths as a power of 10?

_____

b) What is the value of 1,000 tenths as a power of 10?

_____

10 Solve the equation.

Write your answer as a power of 10

$$7x - 200,000 = 500,000$$

_____

1 Write the missing number and power so that these numbers are written in standard form.

a) $0.0004 = \boxed{} \times 10^{\boxed{}}$

b) $0.7 = \boxed{} \times 10^{\boxed{}}$

c) $0.000\,002 = \boxed{} \times 10^{\boxed{}}$

d) $0.000\,000\,000\,03 = \boxed{} \times 10^{\boxed{}}$

2 Write these as ordinary numbers.

a) $8 \times 10^{-5} =$ _____

b) $5 \times 10^{-8} =$ _____

c) $6 \times 10^{-3} =$ _____

d) $5 \times 10^{-1} =$ _____

3 Write these numbers in standard form.

a) $0.0009 =$ _____

b) $0.000\,003 =$ _____

c) five tenths = _____

d) two hundredths = _____

e) $6 \div 100{,}000 =$ _____

f) $0.000\,004 \times 100 =$ _____

g) $0.02^3 =$ _____

h) nine billionths = _____

4 What is the same and what is different about each set of numbers?

a)

| 4×10^{-3} | 6×10^{-3} | 8×10^{-3} |

_____

_____

b)

| 5×10^{-4} | 5×10^{-3} | 5×10^{-6} |

_____

_____

c)

| 8×10^3 | 8×10^{-3} |

_____

_____

5 Solve the equations.

Give your answers in standard form.

a) $100g = 9$ $g =$ _____

b) $4 = 10{,}000b$ $b =$ _____

c) $6 = 2{,}000p$ $p =$ _____

6 Circle the number that lies between 4×10^{-4} and 3×10^{-4}

     0.00038   0.038   0.0038

7 Find the next three terms in the sequence.

Write the terms in standard form.

2×10^{-1}, 0.03, 4×10^{-3}, _____, _____, _____,

8

$$a = 2b + c$$

Find the value of a if $b = 5 \times 10^{-2}$ and $c = 2 \times 10^{-1}$

Write your answer in standard form.

_____

9 A printer's paper tray is 5 cm deep.

One sheet of paper is 8×10^{-3} cm thick.

What is the maximum number of sheets of paper that can fit in the tray?

10 Five numbers have a median of 9×10^{-2}

The range of the numbers is 0.35

One of the numbers is 0.1

Write the 5 numbers.

_____

Is it possible to find more than one solution?