Recognise the place value of any number in an integer up to one billion

1 What numbers are represented on the place value charts?

a)

TTh	Th	H	T	O
●●●●	●●●●●●	●●●●●	●	●●

b)

HTh	TTh	Th	H	T	O
●●●●●	●		●●●●●●●		

c)

Th	H	T	O
●●●●●●●●	●●●		●●

2 Use a place value chart to make these numbers.

a) 15,612   **c)** 1,200,000

b) 954,038   **d)** 3.5 million

3 Draw counters on the place value chart to represent the number.

What is the value of the 7 in each number?

a) 23,704,321

HM	TM	M	HTh	TTh	Th	H	T	O

_____

b) 174,203,250

HM	TM	M	HTh	TTh	Th	H	T	O

_____

4 What number is represented on each place value chart?

a)

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

b)

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

47,401,510

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5 Complete the representations so that they show the same number.

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

Number bond: 25,026,305 = 20,000,000 + 5,000,000 + 20,000 + 6,000 + 300 + 5

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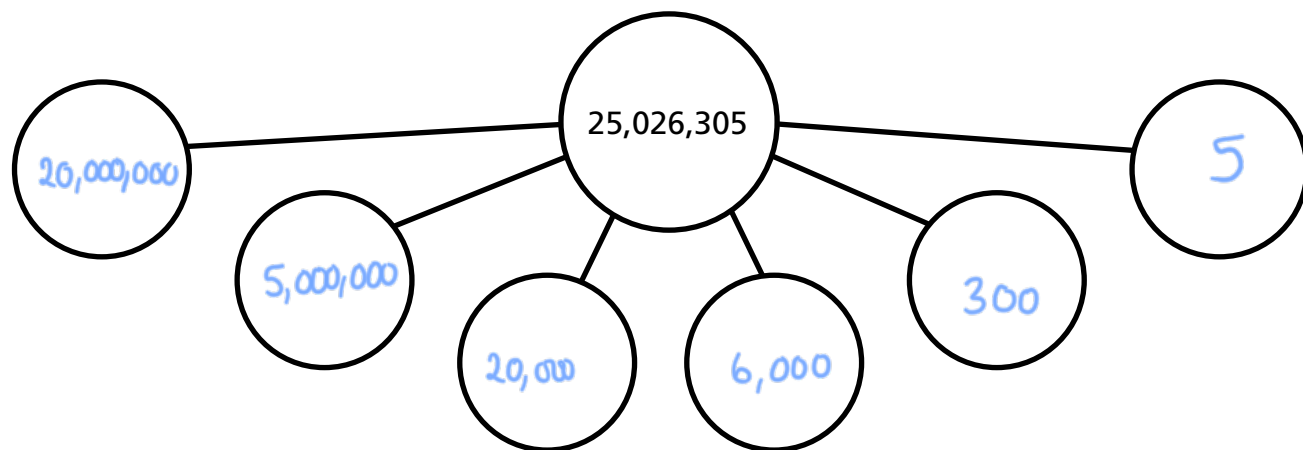
6 State the value of the 6 in each of the numbers.

a) 67   60

b) 7,006,000   6,000

c) 67,000   60,000

d) 67,000,000   60,000,000

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e) 76,000,000   6,000,000

f) 607,000,700   600,000,000

7 Write two numbers to fit each description.

a) There is five in the ten thousands place and five in the tens place.

Eg. 50,050 and 3,751,259

b) There is five in the ten millions place and five in the hundred thousands place.

Eg. 50,500,000 and 153,572,691

8 Complete the additions.

a) 26,300 = 20,000 + 6,000 + 300

b) 715,000 = 700,000 + 10,000 + 5,000

c) 20,957 = 20,000 + 900 + 50 + 7

d) 20,957 = 20,000 + 900 + 57

e) 214,907,000 = 200,000,000 + 14,000,000 + 90,000 + 817,000

9 Work with a partner to see how many ways you can partition the number.

> Thirteen million, four hundred and six thousand, nine hundred and twenty-eight

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

> 7,561

b) one hundred and thirty thousand, eight hundred

> 130,800

c) nine million and seventy

> 9,000,070

d) nine million and seven

> 9,000,007

2 What number is represented?

Write the number in figures and words.

HTh	TTh	Th	H	T	O
●	●● ●	●●		●● ●	●● ●

> 132,033

One hundred and thirty-two thousand and thirty-three

3 What number is represented?

Write the number in figures and words.

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

> 28,302,320

Twenty-eight million, three hundred and two thousand, three hundred and twenty

4 Write the numbers below in words.

a) 9,570

Nine thousand five hundred and seventy

b) 89,904

Eighty-nine thousand nine hundred and four.

c) 8,320,050

Eight million, three hundred and twenty thousand and fifty.

d) 1,000,000,000

One billion.

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

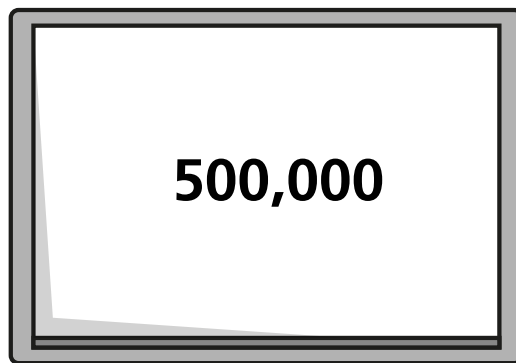a) What is 1 million more than the number?

16,250,508

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

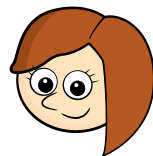15,350,508

c) What is thirty thousand more than the number?

15,280,508

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.

One million is 1,000,000 so half a million is 500,000 which is five hundred

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?

He hasn't used 0 as a place holder in the hundreds column

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

42,510,089

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

Three hundred and twenty-nine million, two thousand three hundred and twenty-seven.

b) The population of the United Kingdom is 66.85 million.
Write this number in words and figures.

Sixty-six million eight hundred and fifty thousand

66,850,000

c) The population of Brazil is nearly a quarter of a billion.
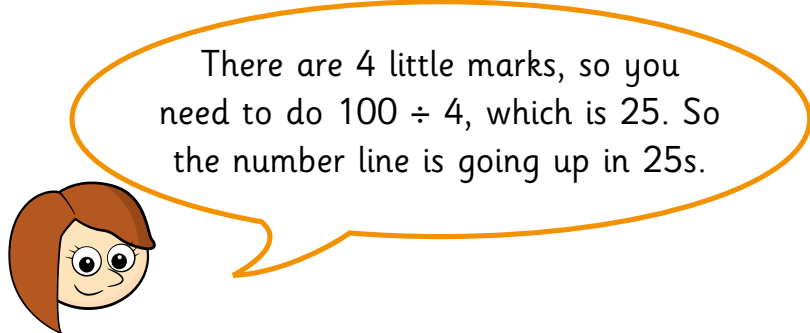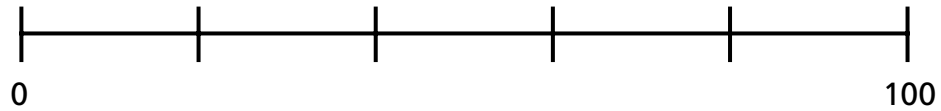Write this number in figures.
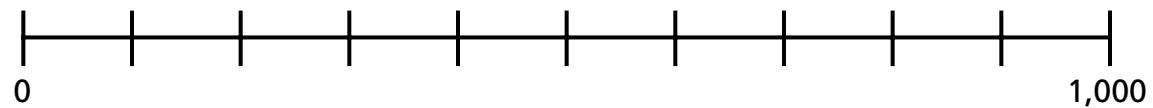
250,000,000

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.

_____

_____

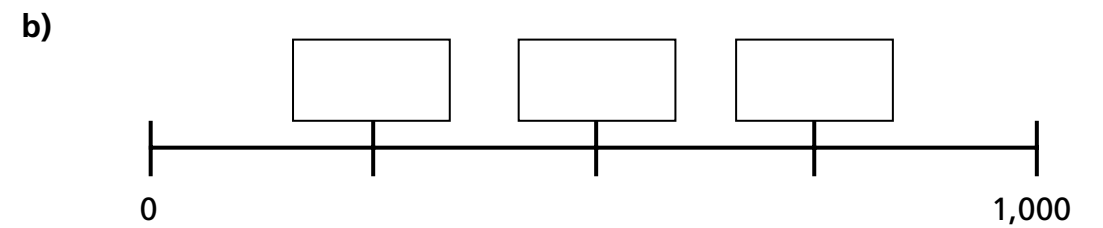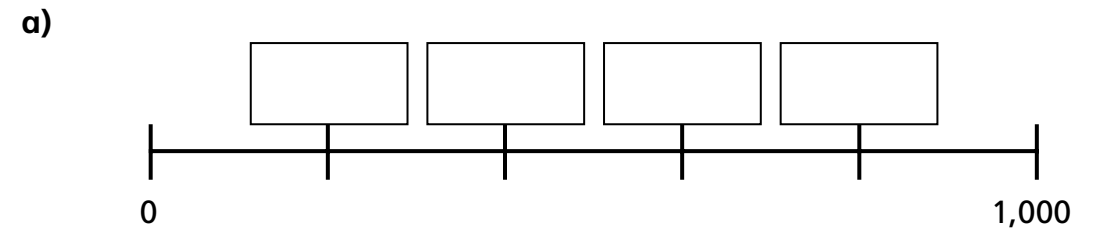**2** Amir thinks this number line goes up in 10s.

0   1,000

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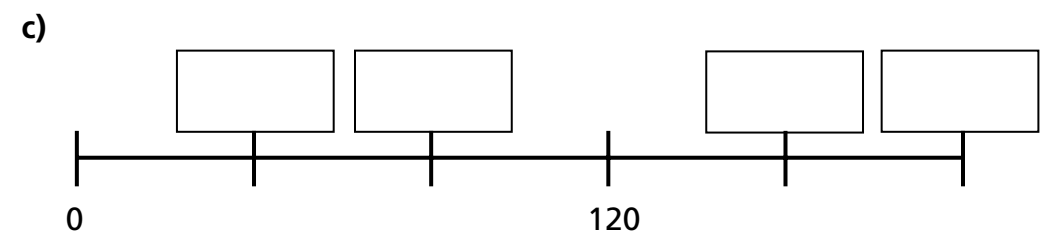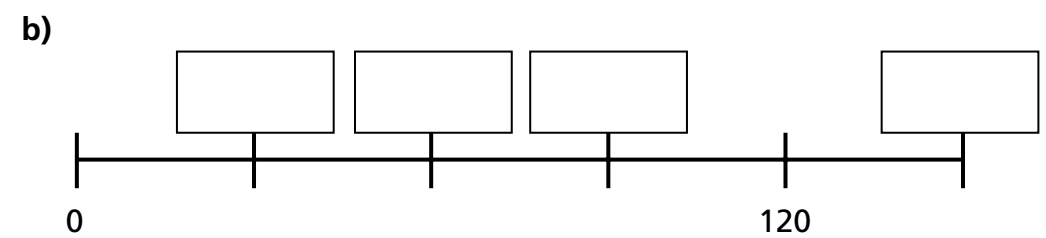
What does the number line go up in?

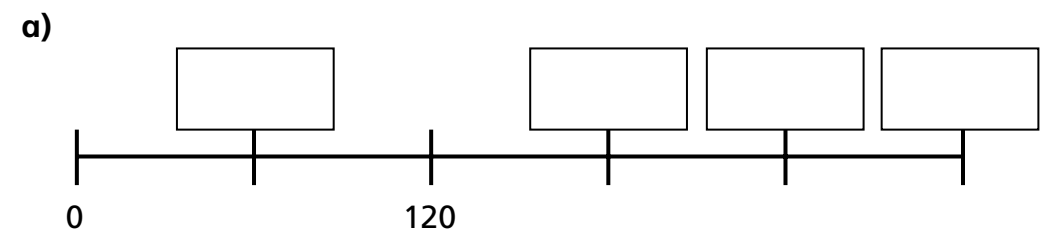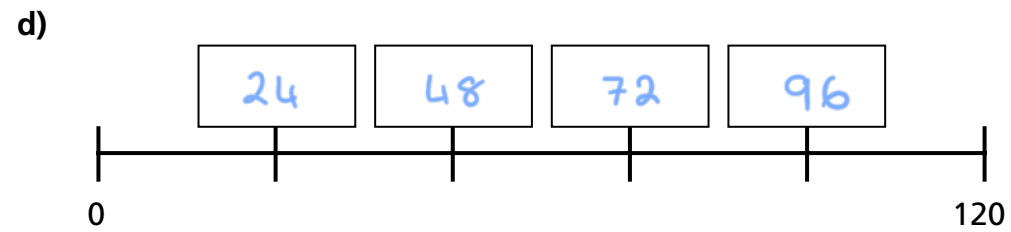Label the intervals on the number line.

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

4 Complete the number lines.

a)

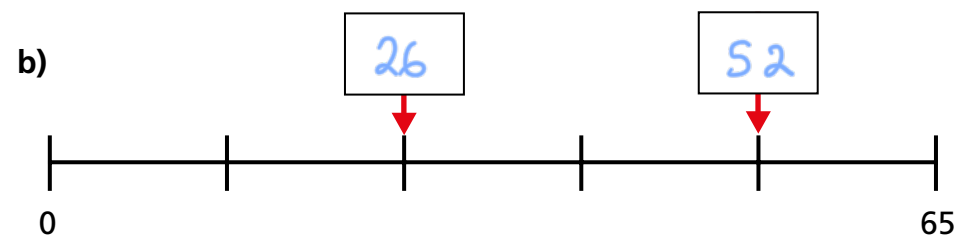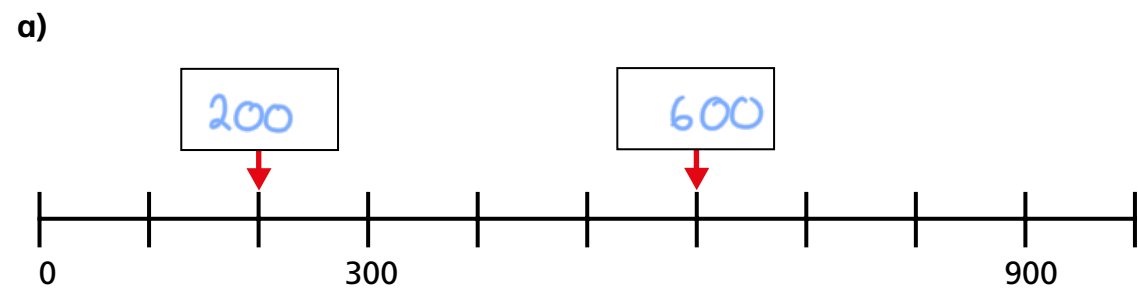0   1,000

b)

0   1,000

5 Label the number lines.

a)

0   120

b)

0   120

c)

0   120

d)

24 | 48 | 72 | 96

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)

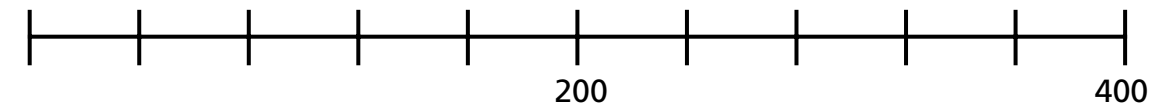200   600

0 ——— 300 ——————— 900

b)

26   52

0 ——————————— 65

7 Find the difference between A and B.

A   B

0 ——— 10 ——— 25 ——— 35 ——— 45

Show all the steps in your working.

The difference between A and B is 35

8 Here is a number line.

——————————————————
200   400
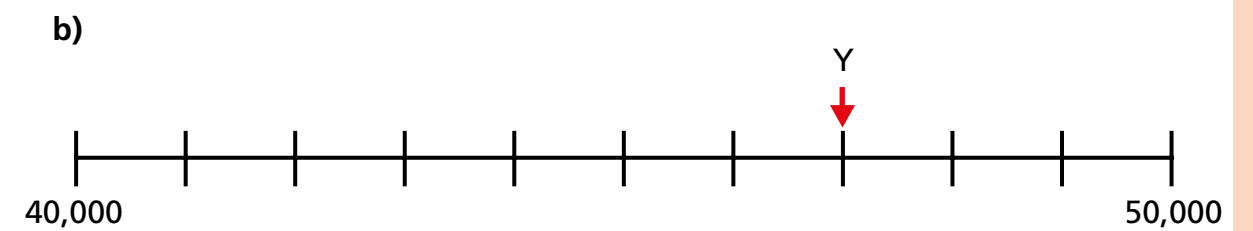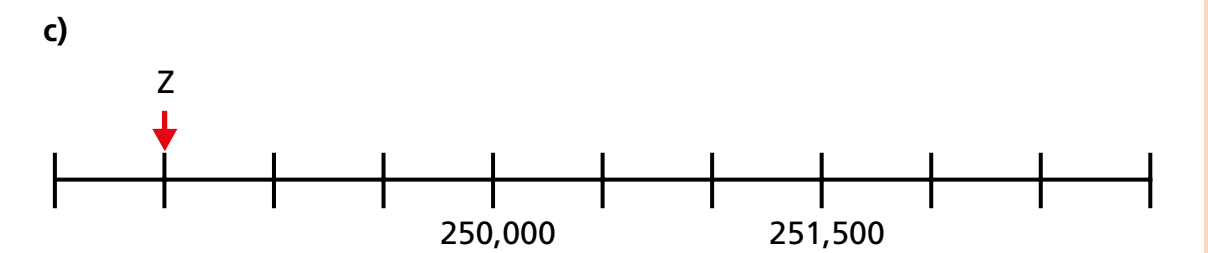
What is the number line going up in?   40s

How do you know?

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

a)

X
↓
——————————————
1,600   2,800

X = 400

b)

Y
↓
——————————————
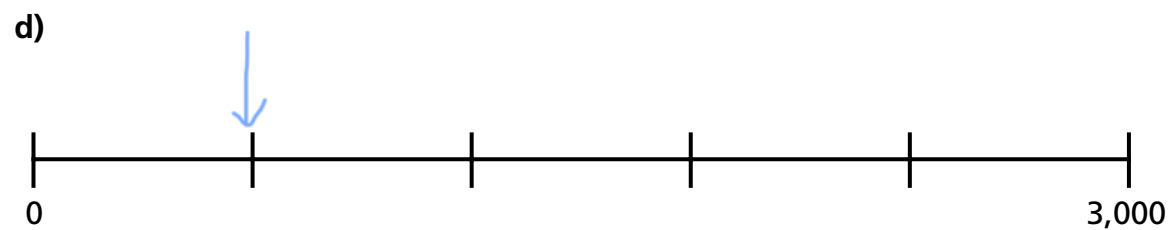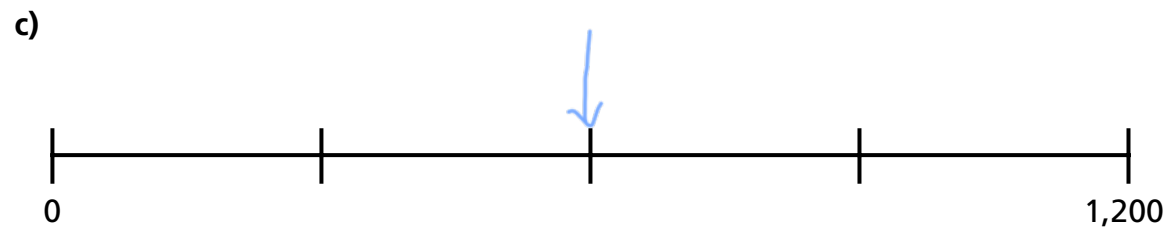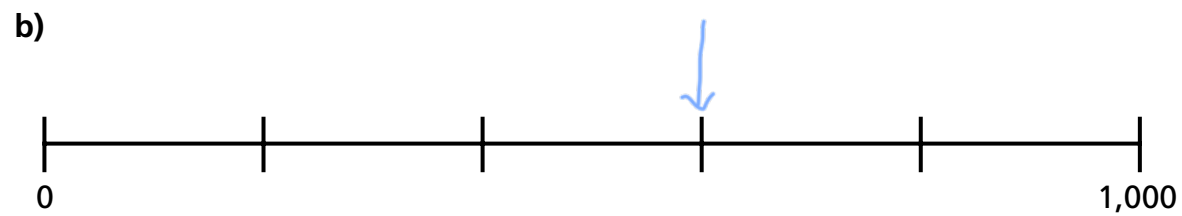40,000   50,000

Y = 47,000

c)
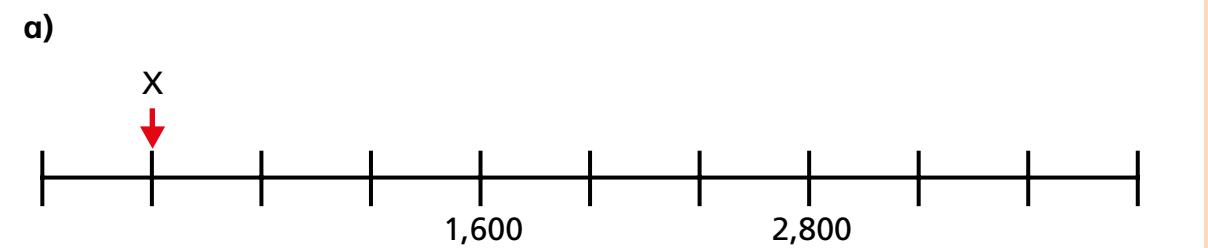
Z
↓
——————————————
250,000   251,500

Z = 248,500

Position integers on a number line

1 Label where the number 600 would be on each of the number lines.

a)

0 ——————————↓—————————— 1,000

b)

0 ——————————↓—————————— 1,000

c)

0 ——————————↓—————————— 1,200

d)

0 —————↓———————————————— 3,000
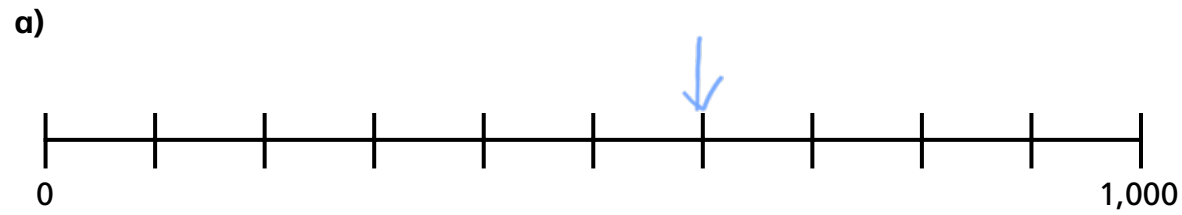
How did you find out where 600 went on each number line?

Did you use the same method as your partner?

2 Where would the number 50 be on each of these number lines?

Mark each number line with an arrow.

a)

0 ——————————↓—————————— 100

b)

0 ——↓———————————— 300

c)

0 ——↓————————— 200

d)

0 ——————————↓——— 40
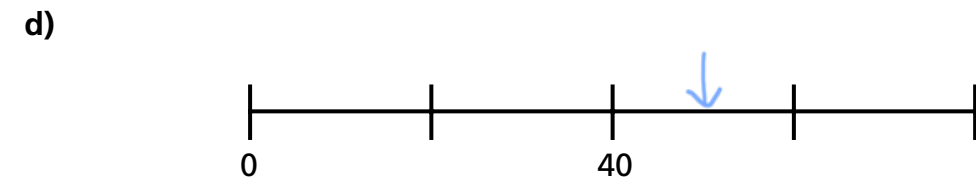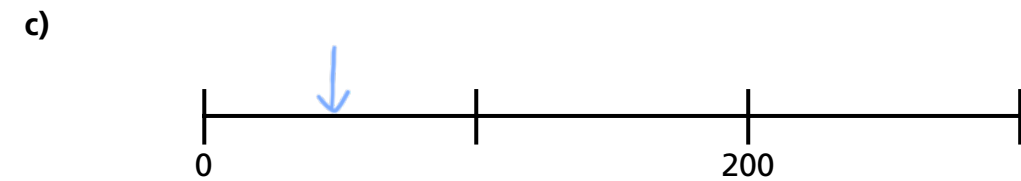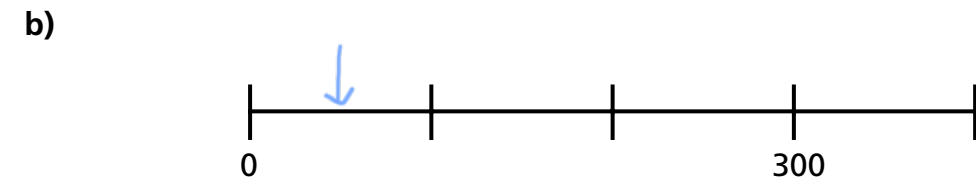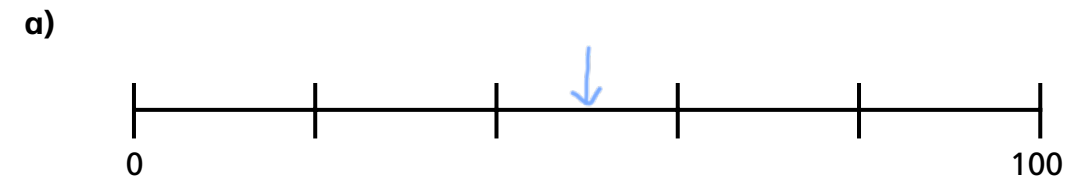
3 Here is a number line.

20↓   160↓   300↓   390↓
————————————————————————
            200   400
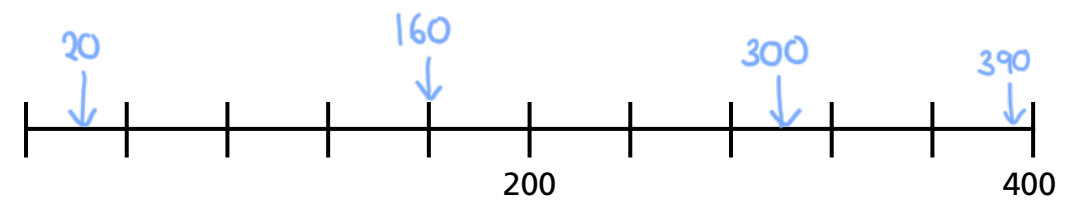
a) What does this number line go up in? [40s]

b) Write these numbers on the number line.

300   160   20   390

4 Annie is working out what value the arrow is pointing to on the number line.

0 — 1,000 — 1,500 — 2,000
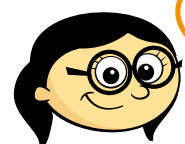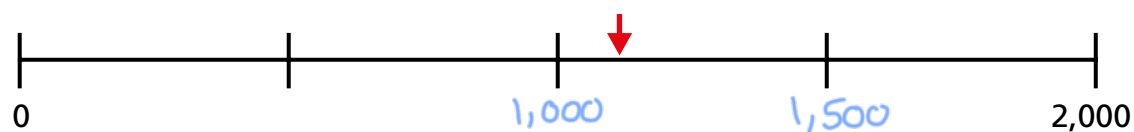
I think the arrow is pointing to 1,300

a) How do you know Annie is incorrect?

1,300 is closer to 1,500 than 1,000 the arrow isn't.

b) Estimate what number the arrow is pointing to.

E.g. 1,100

c) Did you get the same answer as your partner?

5 Here is a number line from 0 to 5,000

2,000   4,263
↓   ↓

0   5,000
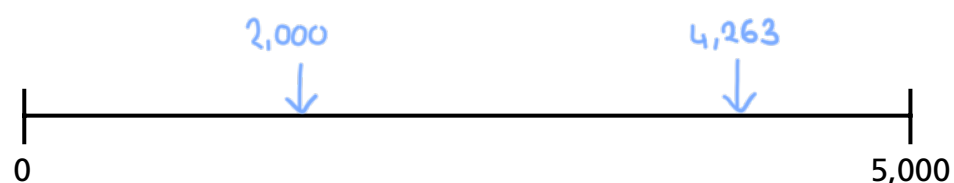
a) Estimate where the number 2,000 would be.
   Mark it with an arrow and label it.

b) Estimate where the number 4,263 would be.
   Mark it with an arrow and label it.

6 Estimate the value the arrow is pointing to on the number lines.

a)

650

0 ——— 400

b)

260

0 — 300 — 600 — 900
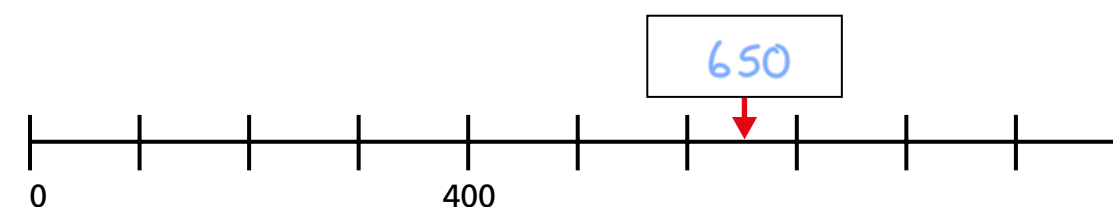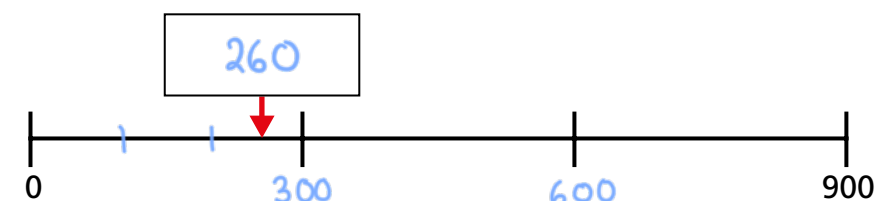
c) Is it possible for two people to get different answers, but both be correct?

Yes, it's an estimate.

7 Estimate the temperature on each thermometer.

a)   **b)**   **c)**

50°   100°   110°

                         20°

0°   -40°
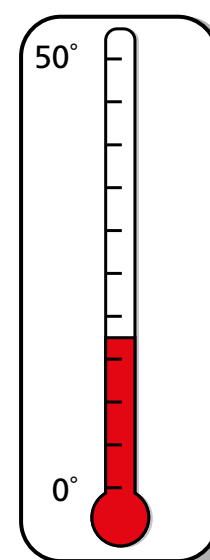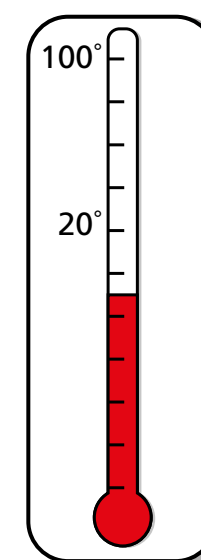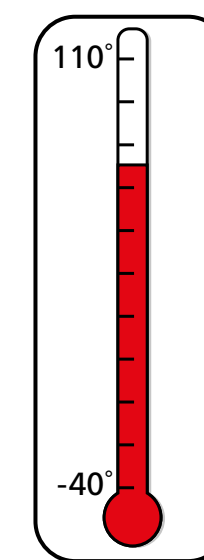
Eg. 22°C   -10°C   73°C

Round integers to the nearest power of ten

White Rose Maths

1 Complete the sentences.

a) 57 rounded to the nearest 10 is [60]

257 rounded to the nearest 10 is [260]

657 rounded to the nearest 10 is [660]

1,157 rounded to the nearest 10 is [1,160]

230,457 rounded to the nearest 10 is [230,460]

b) 1,183 rounded to the nearest 10 is [1,180]

1,184 rounded to the nearest 10 is [1,180]

1,185 rounded to the nearest 10 is [1,190]

1,186 rounded to the nearest 10 is [1,190]

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?

He should have looked at the tens column.
1,288 rounded to the nearest 100 is 1,300

3 Round these numbers to the nearest 100

a) 729 [700]   **d)** 11,872 [11,900]

b) 1,705 [1,700]   **e)** 9,975 [10,000]

c) 7,650 [7,700]   **f)** 45 [0]

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?

[15,649]

Explain your answer.

15,649 is the greatest integer that rounds to 15,600 to the nearest 100. 15,650 would round to 15,700

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? __Mo__

Give reasons for your answer.

7,001 rounds to 7,000 to the nearest 10, 100 and 1,000

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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	40,000	37,000	36,900
81,055	80,000	81,000	81,100
7,908	10,000	8,000	7,900
126,388	130,000	126,000	126,400

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.

Any five numbers between 17,250 and 17,349 inclusive.

7 Here are some digit cards.

2	9	5	0	4
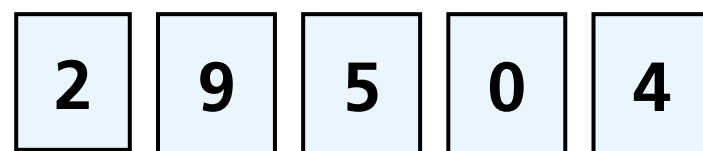
Use all the digits to make a number that will round to:

● 43,000 to the nearest 1,000   42,950

● 95,200 to the nearest 10   95,204

● 50,000 to the nearest 10,000   49,520

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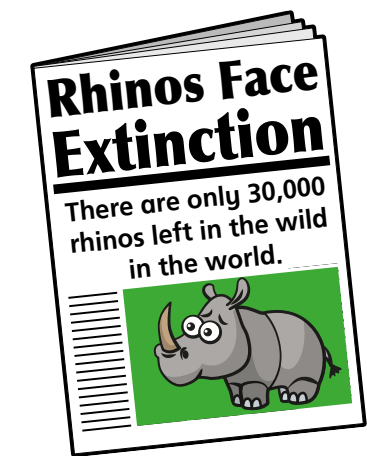
a) Do you think there are exactly 30,000 rhinos left in the wild?

Give reasons for your answer.

b) What is the greatest possible number of rhinos?   34,999

c) What is the least possible number of rhinos?   25,000

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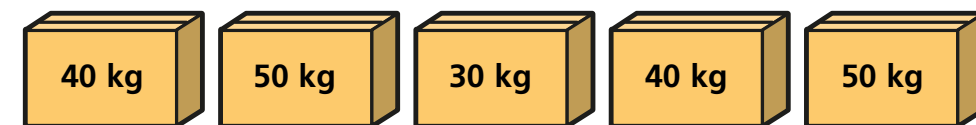
The boxes need to be put on a pulley lift to transport them to the top floor of a building.

The maximum load of the lift is 225 kg.

Is it safe to transport all 5 boxes at once? No

Explain your reasoning.

40 + 50 + 30 + 40 + 50 = 210kg   Each box could weigh up to 5kg more than it is labelled. 5 × 5kg = 25kg
210kg + 25kg > 225 kg

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 __is greater than__ 52

52 __is less than__ 502

b) 30,099 < 90,003

30,099 __is less than__ 90,003

90,003 __is greater than__ 30,099

c) 76,590 ≠ 75,609

76,590 __is not equal to__ 75,609

75,609 __is not equal to__ 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
●●●●	●●●●	●●●●● ●●●● ●	●●●●					

✓

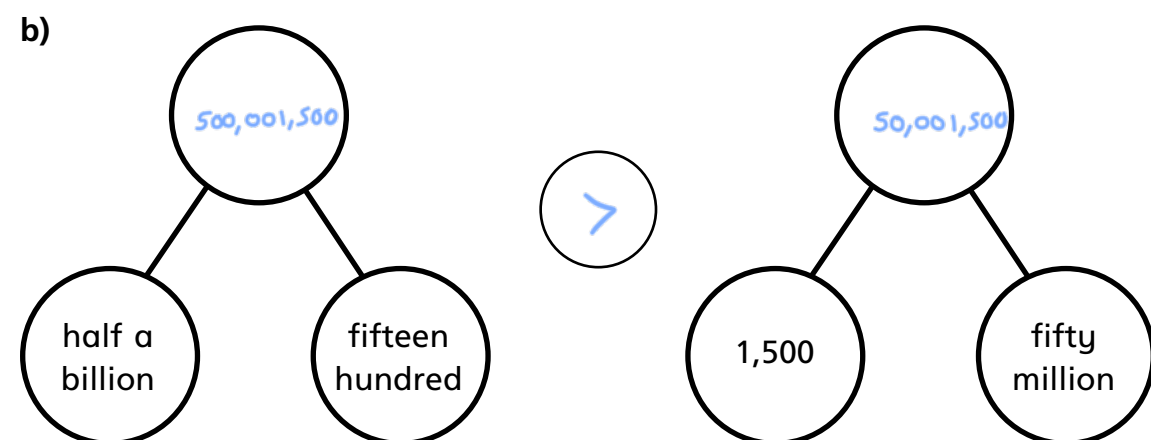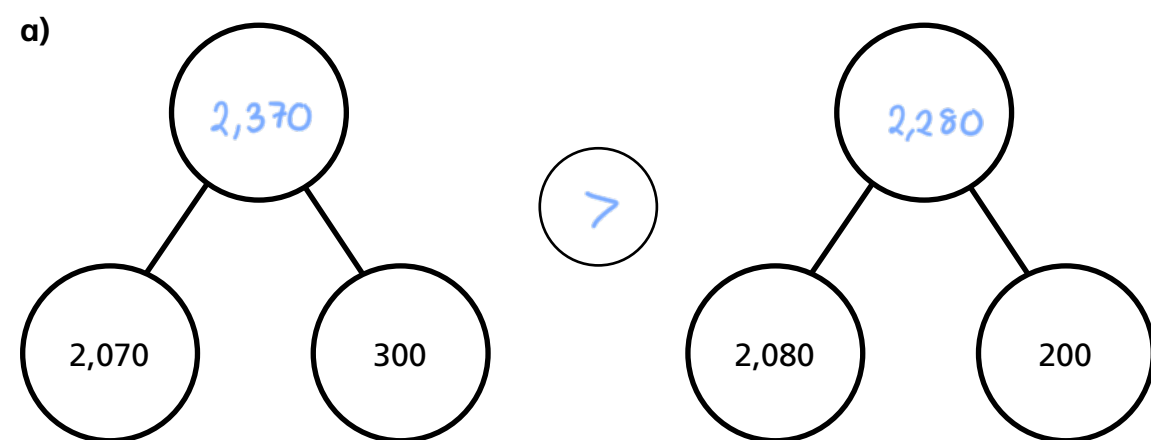**4** Write = or ≠ to complete the statements.

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)

2,370 (>) 2,280

2,070   300   2,080   200

b)

500,001,500 (>) 50,001,500

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,_1_35 < 7,42_0_   7,_3_35 < 7,42_9_

b) 97_9_ > 97_7_8   97_0_ > 9_6_8

c) 3,8_7_9 < 3,_9_76   3,8_1_9 < 3,_9_76

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

E.g.   50,181   50,190   50,193   50,197   50,199

_____

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

True. If A is less than B and B is less than C then A must be less than C.

b) A could be equal to B

False. A is strictly less than B

_____

c) B lies between A and C

True. A is less than B and B is less than C so B lies somewhere between A and C.

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

There are 5 missing digits.

E.g.   48_0_1_9 < _5_6_2_7_3

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?

37,900

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

It has the greatest number of ten thousands.

c)   Write the numbers in descending order.

37,900   27,903   20,709   20,307

2   Write the values in ascending order.
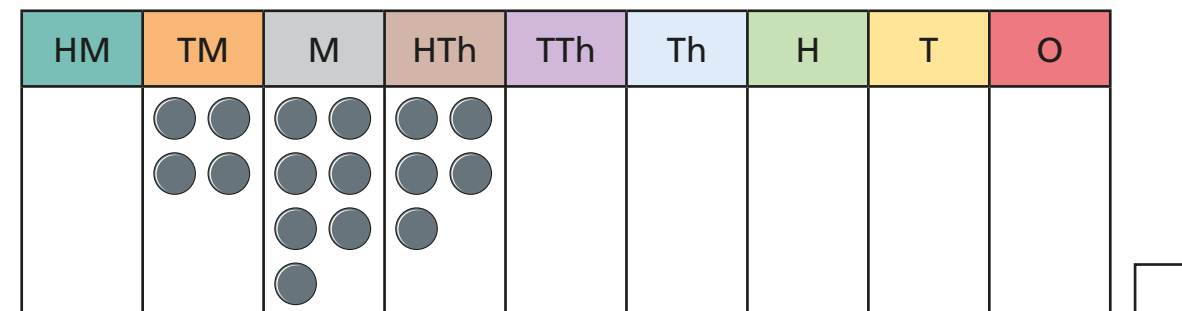
a)   13,000 kg   15,700 kg   12,995 kg   8,700 kg

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

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

89,000   two hundred thousand   950,000

3 million

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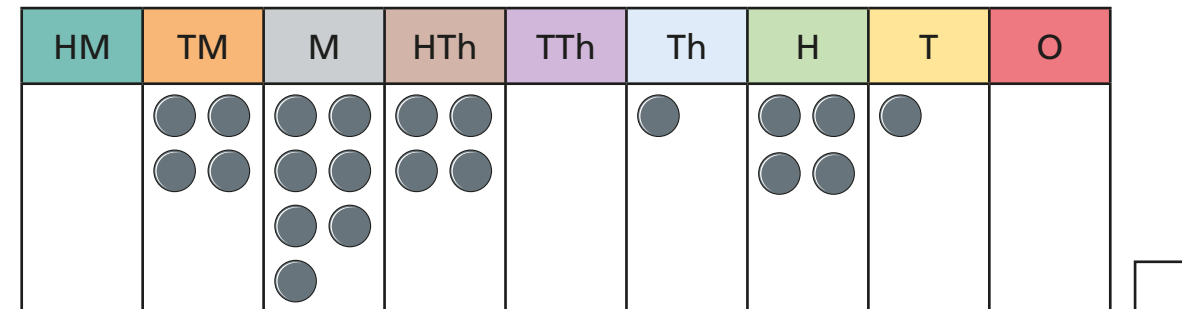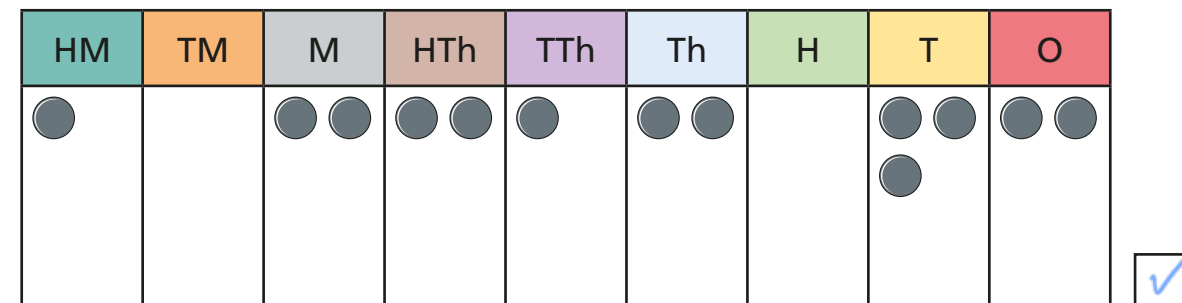
a)   Which chart represents the greatest number? Tick your answer.

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

It is the only number with a counter in the hundred millions column.

c)   Write the greatest number in figures.

102,212,032

d)   Write the numbers in descending order.

102,212,032   47,500,000   47,401,410

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? ___NO___

Explain your answer.

She hasn't considered the place value of the digits.

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? __D__

b) Which player has the lowest transfer fee? __B__

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

E.g. 5,10_1_ < 5,1_1_0 < _5_, _1_11 < _5_, _1_ _2_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?

___Sao Paulo___

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

What could be the population of Mumbai?   E.g. | 21,000,000 |

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.

E.g.

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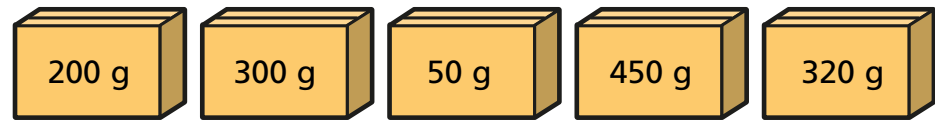
a) Eva thinks that the range of the weights is 320 g – 200 g = 120 g.

What mistake has Eva made?

She hasn't put the boxes in order of weight.

b) What is the range of weights?

400g

2 Work out the range of each set of numbers.

a) 6, 8, 2, 1, 6, 4, 3, 1   7

b) £15, £17, £28, £27, £28, £21   £13

c) 839 m, 900 m, 839 m, 903 m, 983 m   144

d) 56, 65, 0, 56   65

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?

98 litres

4 Work out the range of these numbers.

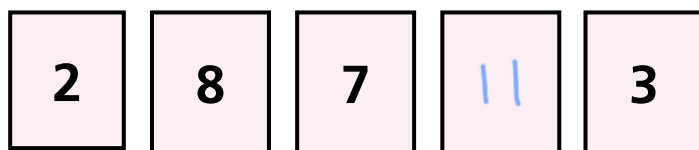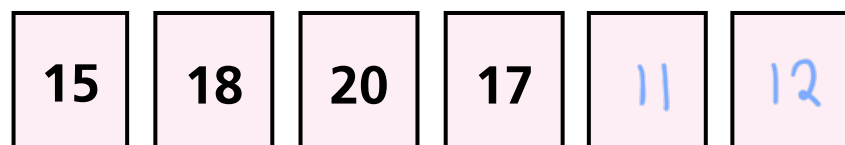| twenty-five thousand seven hundred and six | two hundred and fifty thousand and seventy-six |

| 257,006 | 2,500,760 |

| 205,706 |

2,475,054

5 The range of each set of cards is 9

What could the value of the blank cards be?

a)

| 2 | 8 | 7 | 11 | 3 |

b)

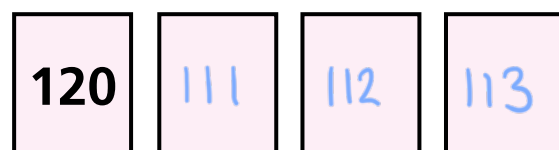| 15 | 18 | 20 | 17 | 11 | 12 |

c)

| 120 | 111 | 112 | 113 |

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?

325

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

211

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?

5

8 Here are the times that 5 students took to complete a puzzle.
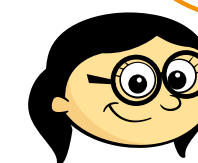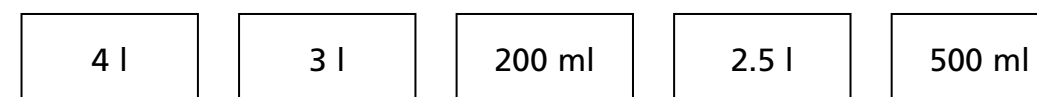
3 minutes   220 seconds   2.5 minutes

1 minute and 15 seconds   125 seconds

What is the range of the times?

145 seconds

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.

She hasnt converted units.

b) What is the range of the amounts?

3.8L or 3,800ml

Find the median of a set of numbers

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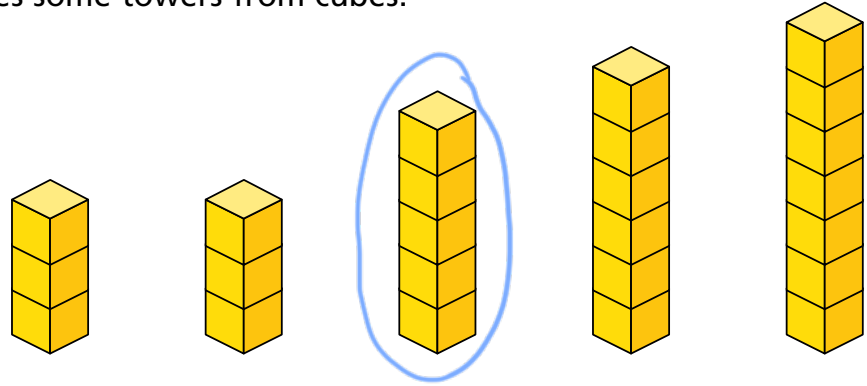
a) Circle the median tower of cubes.

Explain your answer.

It is the middle tower when they're in height order.

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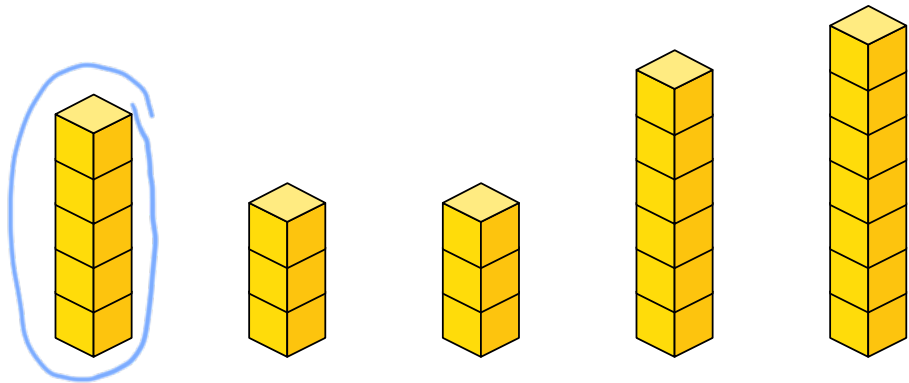
b) Circle the median tower of cubes.

Explain your answer.

It would be the middle tower if they were in height order.

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

a) 4, 9, 1, 2, 12

median = 4

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

median = 26 cm

c) £20, £14, £18, £16

median = £15

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

median = 345g

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 = 61 %

4 Five numbers have a median of 8

E.g. | 2 | 6 | 8 | 9 | 9 |

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 | 14 | 23 |

b) The median of these weights is 48 kg.

| 32 kg | 39 kg | 42kg | 54 kg | 68 kg | 300 kg |

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

Write the 4 numbers.

| 8 | 9 | 11 | 12 |

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.
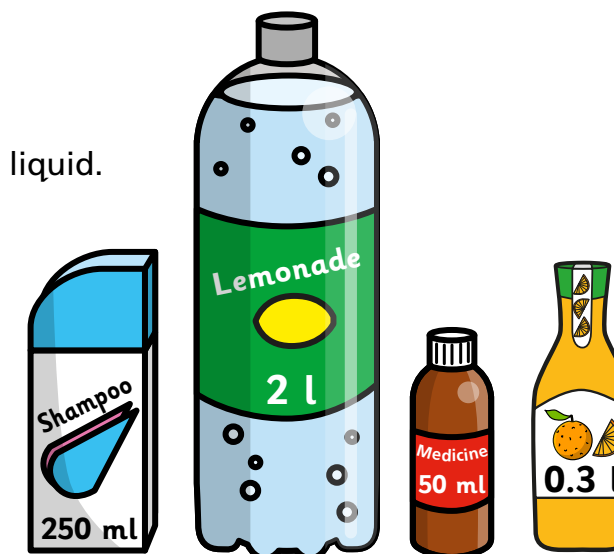
Median = 275 ml

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?

It could increase or stay the same.

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?

41

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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 **5** tenths and **3** hundredths.

0.53 = 0.**5** + 0.0**3**

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 __ones__ , 2 __tenths__ and **7** hundredths.

5.27 = 5 + **0** . **2** + **0** . **0** **7**

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

2·304

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
		○ ○ ○ ○ ○	○ ○

__5 tenths (0·5)__   __2 hundredths (0·02)__

b) 5.2

Tens	Ones	Tenths	Hundredths
	○ ○ ○ ○ ○	○ ○	

__5 ones (5)__   __2 tenths (0·2)__

c) 50.02

Tens	Ones	Tenths	Hundredths
○ ○ ○ ○ ○			○ ○

__5 tens (50)__   __2 hundredths (0·02)__

5 Complete the part-whole models.

a)

0.58
0.5   0.08

c)

0·75
0.05   0.7

b)

1.5
1   0·5

d)

0·635
0.6   0.035
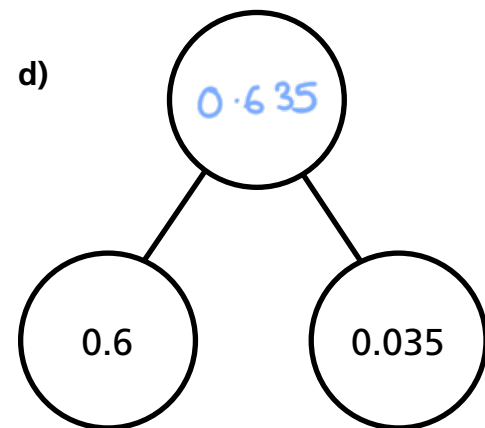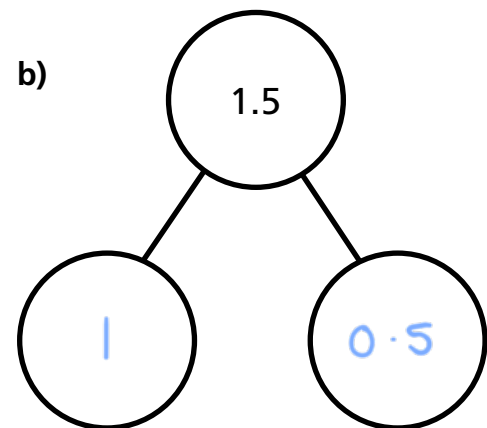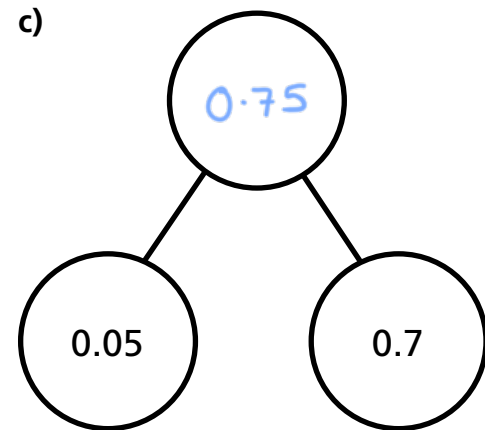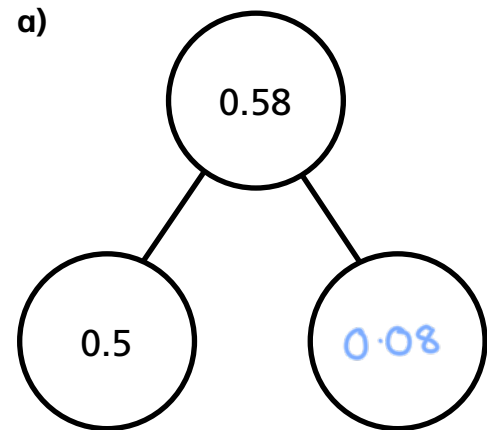
What is the value of the 5 in each number?

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 ___ones___ + 6 tenths + 2 ___hundredths___ = _5_3._6_2

b) | 9 | hundreds + | 2 | ones + | 4 | ___tenths___ = 902.4

c) 7 tens + 3 ones + 9 hundredths = | 7 | 3 | . | 0 | 9 |

d) 2 tenths + 8 hundredths = | 0 | . | 2 | 8 |

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? ___Jack___

Give reasons for your answer.

0·45 = 0·4 + 0·05

0·4 = 4 tenths = 40 hundredths

Position decimals on a number line

White Rose Maths

1 Label the number lines.
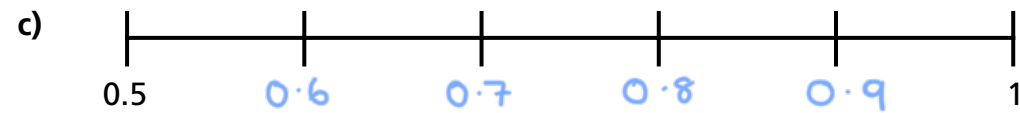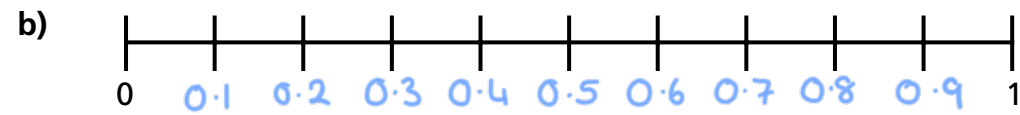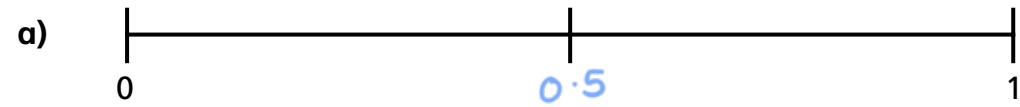
a)

0   0·5   1

b)

0   0·1   0·2   0·3   0·4   0·5   0·6   0·7   0·8   0·9   1

c)

0.5   0·6   0·7   0·8   0·9   1

d)

0.25   0·5   0·75   1

2 What numbers are the arrows pointing to?

3   3·5   4·5

0   1   2

3 What numbers are the arrows pointing to?

a)

5   8·5

0   10

b)

7·2   7·7   7·85

7   8

c)

2·51   2·555   2·585

2.5   2.6
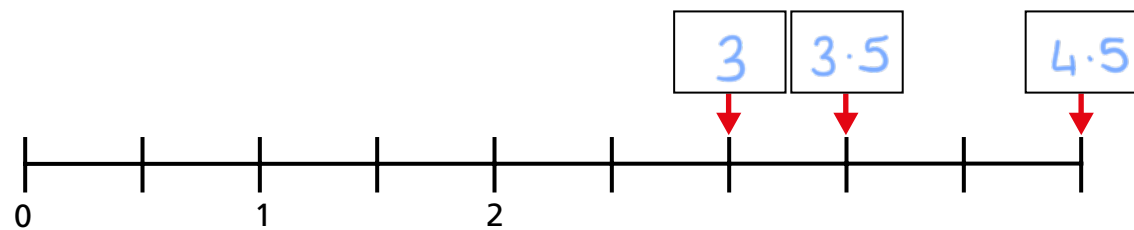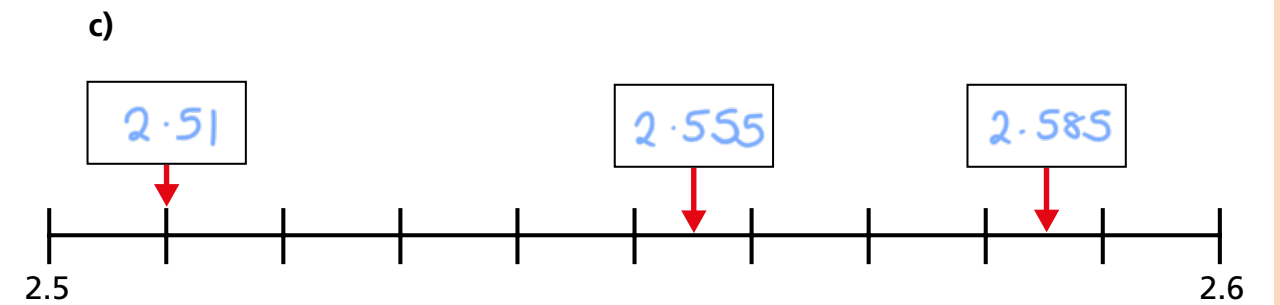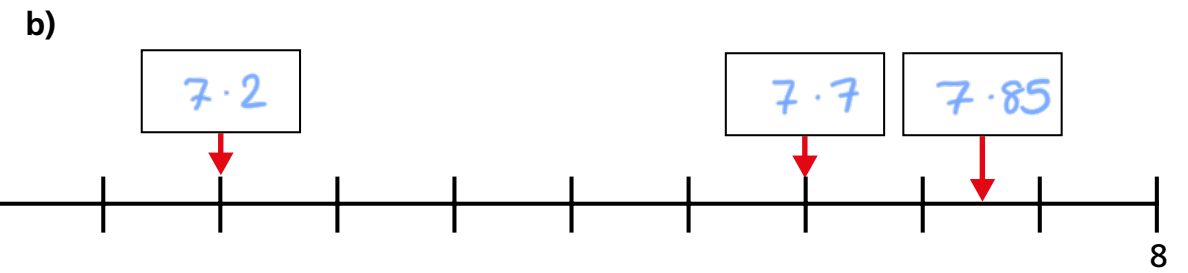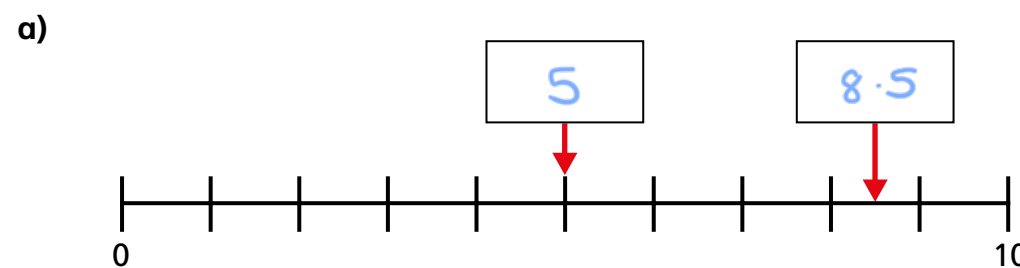
4 Kim thinks the arrow is pointing to 4.2

4   5   6
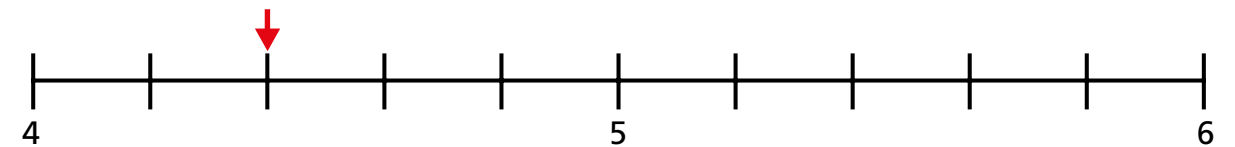
Is Kim correct? __NO__

Explain your answer.

The number line is going up in 0·2s so the arrow is pointing 4·4

5 What does each interval on the number line represent?

10   11
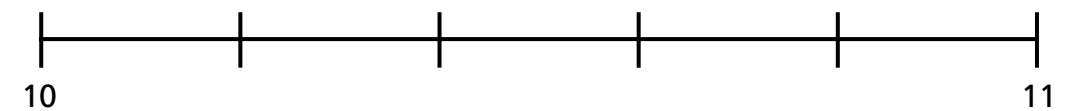
Each interval on the number line represents   0·2

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6 The bar chart shows the rainfall in a city for the first four months of the year.
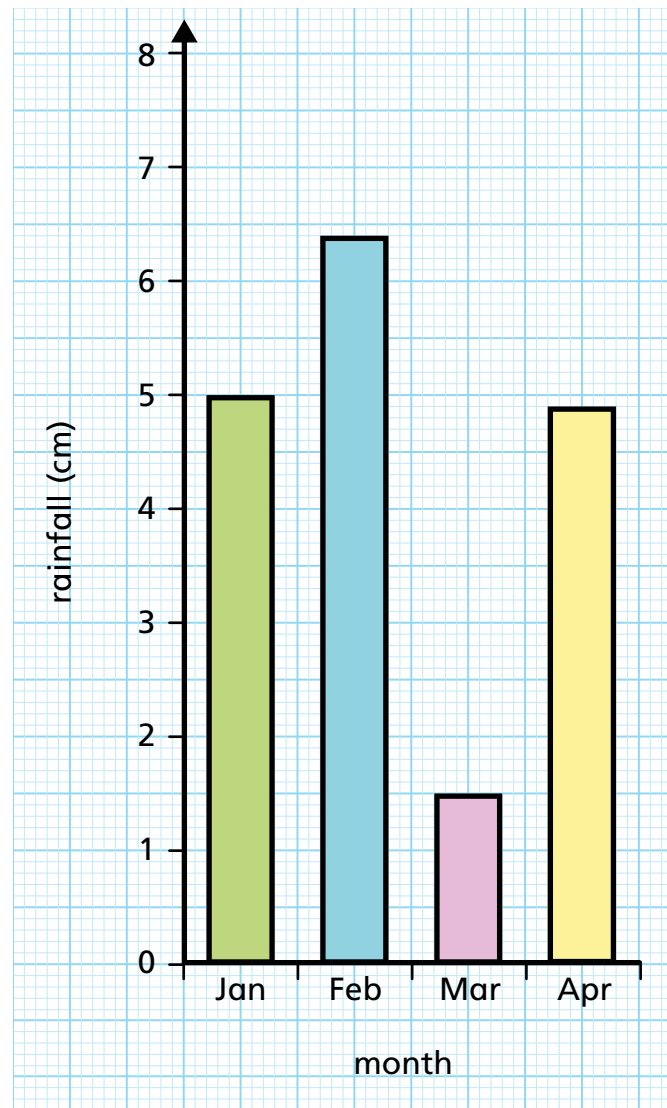
rainfall (cm) / *month*

Complete the table.

Month	Jan	Feb	Mar	Apr
Rainfall (cm)	5 cm	6.4 cm	1.5 cm	4.9 cm

7 Label the number line.

11.9   11.95   12   12.05   12.1   12.15   12.2

8 Label the number 2 on each number line.

a)
2 ↓
1.7   2.3

b)
2 ↓
0.8   2.4

c)
2 ↓
1.1   3.2

d)
2 ↓
1.6   1.76
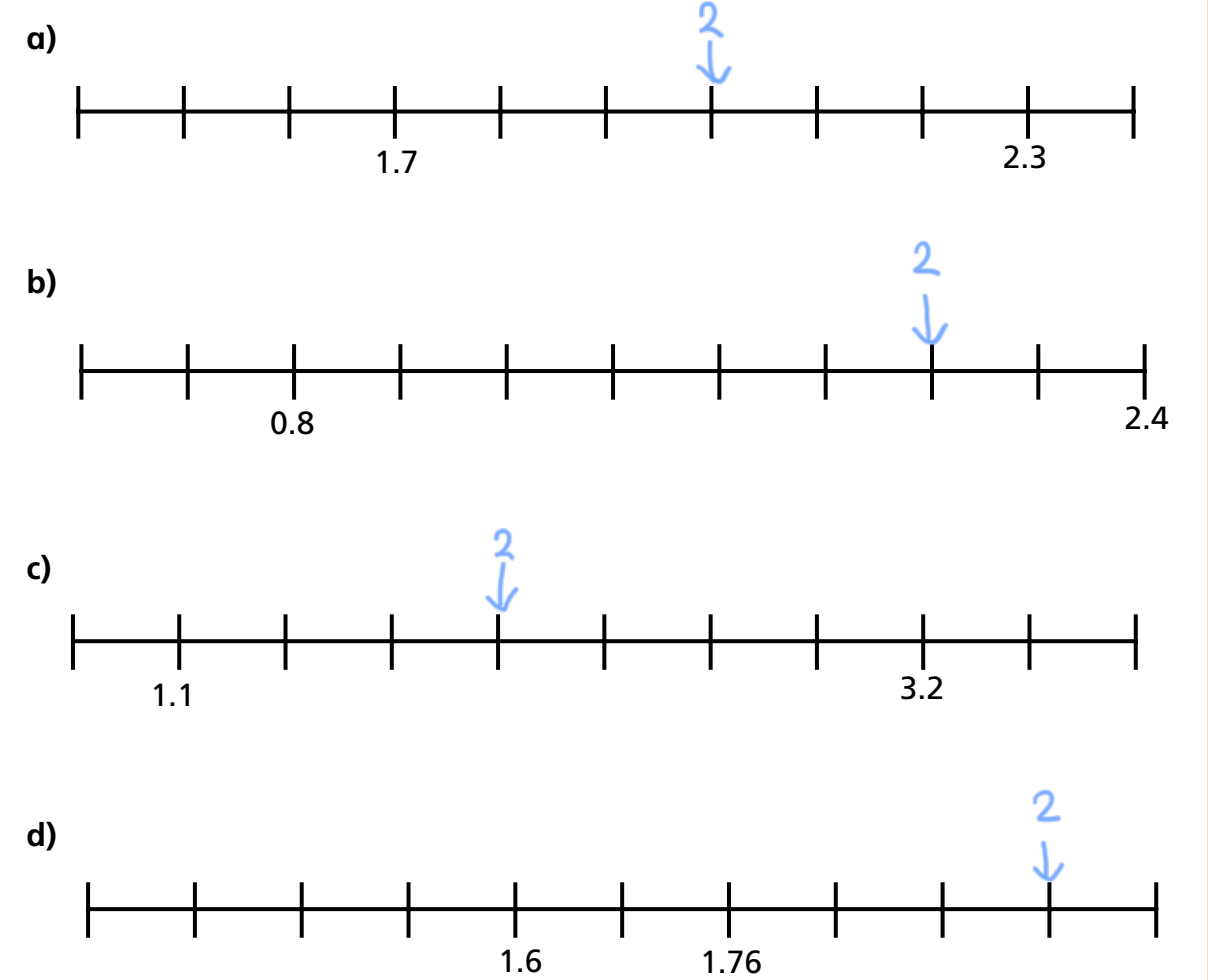
9 What could the end points be on this number line?

E.g.   5   5.4

5.2
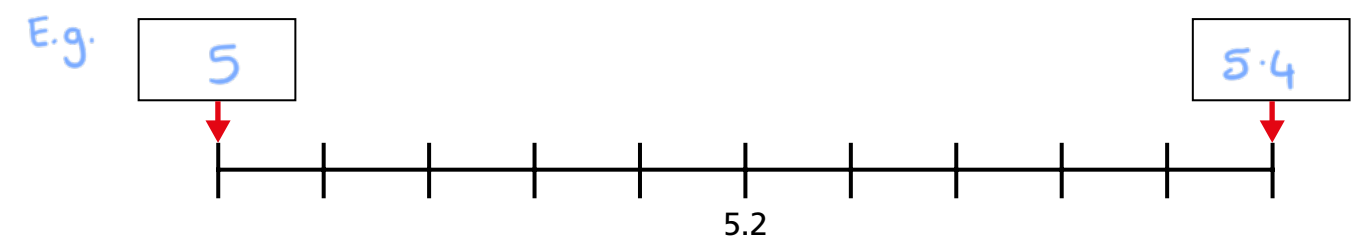
How many solutions can you find?

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	
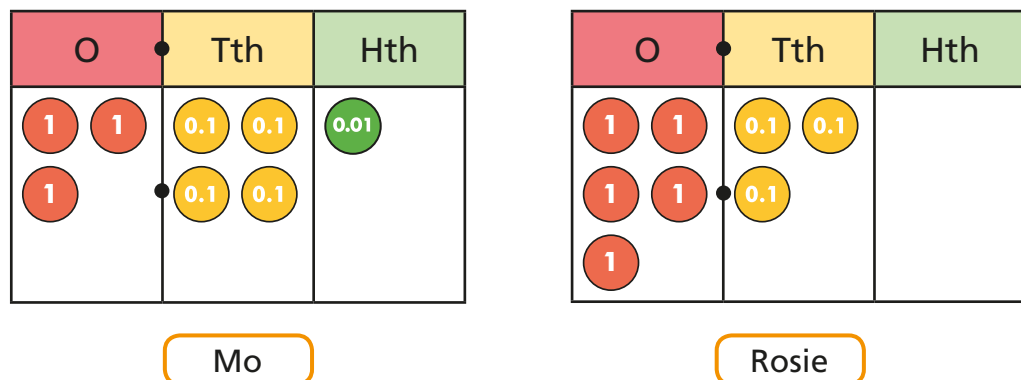
Rosie

Who has made the greatest number? __Rosie__

Explain how you know.

Her number has 5 ones and Mo's only has 3

2 Write < or > to compare the numbers.

a)

T	O	Tth
10	1 1 1	0.1 0.1 0.1 0.1

<

T	O	Tth
10	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
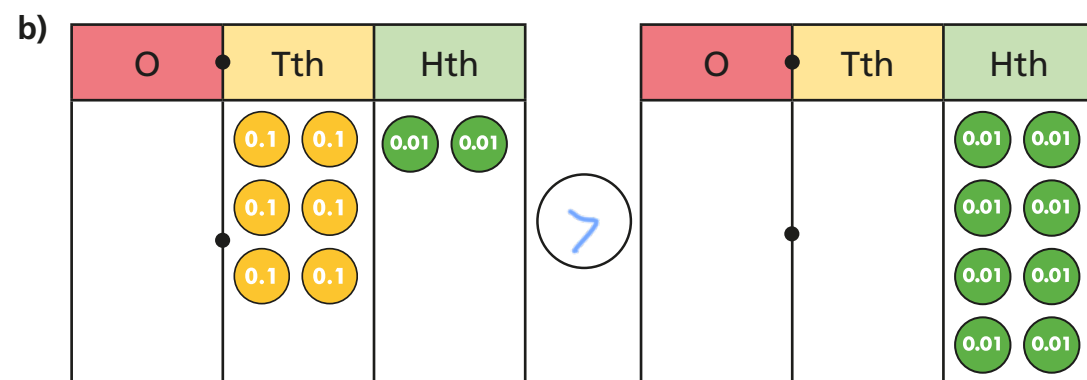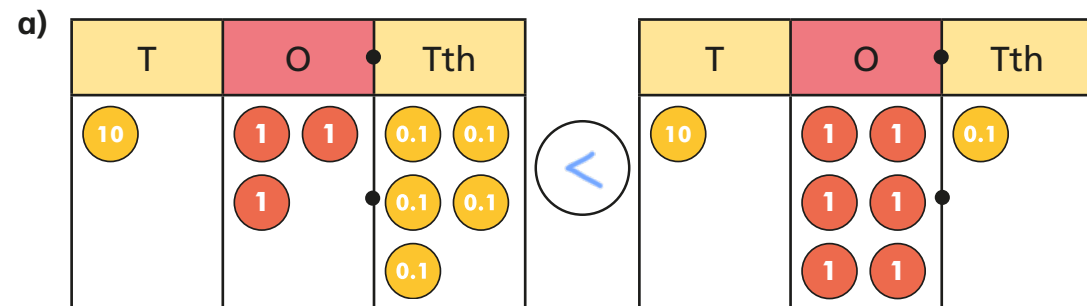
c) 1.43 ⟩ 1.34

d) 30.14 ⟨ 31.4

3 Ron is comparing numbers.
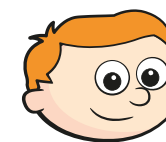
> 5.3 is less than 5.18 as 3 is less than 18

Is Ron correct? __No__

Explain your answer.

5.3 has 3 tenths and 5.18 only has 1 tenth and 8 hundredths.

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
1	0	0	2
2	0	2	0
0	0	2	1
1	0	1	0
0	2	0	1
0	0	1	2

b) Write the numbers in ascending order.

_0.12, 0.21, 2.01, 10.02, 10.1, 20.2_

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.
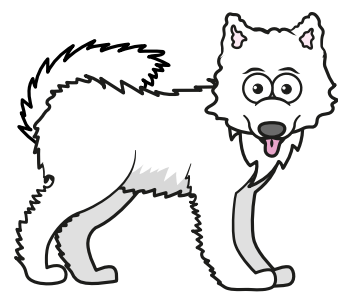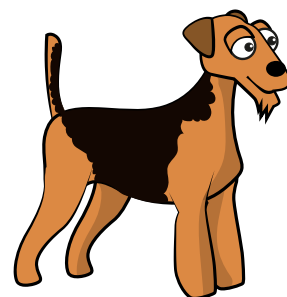
20.37 kg   20.73 kg   20.7 kg

a) Write the weights in descending order.

20.73kg,   20.7kg,   20.37kg

b) A fourth dog is weighed.

This dog is the second heaviest of all the dogs.

What could the weight of this dog be?

E.g.   20.72 kg

Is there more than one answer?

7 Write the numbers in ascending order.

a) 4.5   45   0.45   0.504

0.45   0.504   4.5   45

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

130.9km   132.5km   135km   1,039.5km

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.$\underline{7}$8

b) 3$\underline{2}$.$\underline{6}$ < 32.64

5.8 < 5.$\underline{8}$8

3$\underline{2}$.$\underline{7}$ > 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$\underline{7}$ 0.$\underline{9}$8   1.$\underline{0}$ $\underline{1}$.1$\underline{2}$ 1.$\underline{2}$2

How many answers can you find?

Various answes available.

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	Hundreds	700
758	Hundreds	800
7,300	Thousands	7,000
7,780	Thousands	8,000
704,000	Hundred Thousands	700,000
7.9	Ones	8
0.71	Tenths	0.7

2 Round the numbers to 1 significant figure.

a) 328   300

b) 1,719   2,000

c) 1,219   1,000

d) 83   80

e) 89.6   90

f) 83.67   80

g) 9.84   10

h) 96.9   100

3 Alex rounds 459 to 1 significant figure.

This is 500 to 1 significant figure.
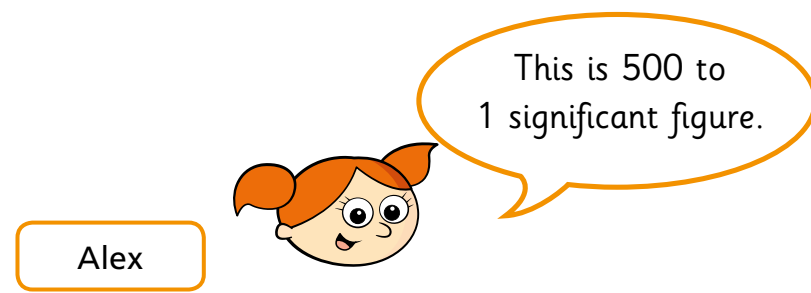
Alex

a) Is Alex correct? ___Yes___

Explain why.

The first significant figure is in the hundreds position and 459 to the nearest 100 is 500

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

Ron
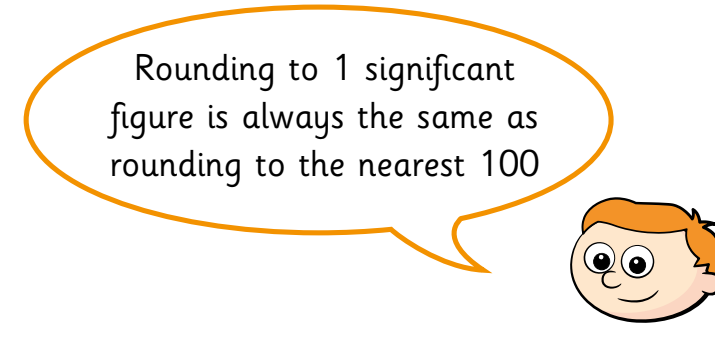
Is Ron correct? ___No___

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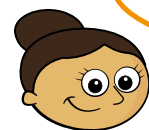
0.086 rounds to 0.1 as 8 is greater than 5, so the 0 goes up to a 1

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

Dora should have looked at the thousandths column to
round. The correct answer is 0.09

6 Round the numbers to 1 significant figure.

a) 0.0451 | 0·05

0.451 | 0·5

0.000451 | 0·0005

b) 0.0000662 | 0·00007

0.0002662 | 0·0003

2.000662 | 2

7 Tommy rounds 0.003872 to 1 significant figure.

0.004000

How could Tommy improve his answer?

_0·004_

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.

99 is two significant figures. The correct
answer is 100

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

0·9375

Round the answer to 1 significant figure.

0·9

9 The attendance at a football match is 28,765

a) Round this number to 1 significant figure.

30,000

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?

64,999

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

55,000

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.

1 Complete the statements.

a) $2^3 = $ ☐2 × ☐2 × ☐2

b) $5^6 = $ ☐5 × ☐5 × ☐5 × ☐5 × ☐5 × ☐5

c) $3^5 = $ $3 \times 3 \times 3 \times 3 \times 3$

d) $6 \times 6 = 6$ ☐2   e) $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 = $ ☐9 ☐7

2 Write these numbers in the form 10^n

a) $100 = 10 \times 10 = 10$ ☐2

b) $1{,}000 = 10 \times 10 \times 10 = 10$ ☐3

c) $100{,}000 = 10 \times 10 \times 10 \times 10 \times 10 = 10$ ☐5

d) $10 = 10$ ☐1

e) $100{,}000{,}000 = 10$ ☐8

3 Eva writes 10^5 as 1000000

> 10^5 has a power of 5, so you need to write 10 and 5 extra zeros.
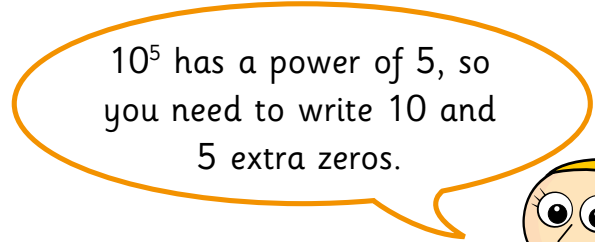
Is Eva correct? No

Explain your answer.

4 Write these powers of 10 as ordinary numbers.

a) $10^2 = $ 100

b) $10^4 = $ 10,000

c) $10^9 = $ 1,000,000,000

d) $10^{12} = $ 1,000,000,000,000

Explain how you worked out the answers.

Did you use the same method for each question?

When working out powers of 10, the power indicates the number of zeros.

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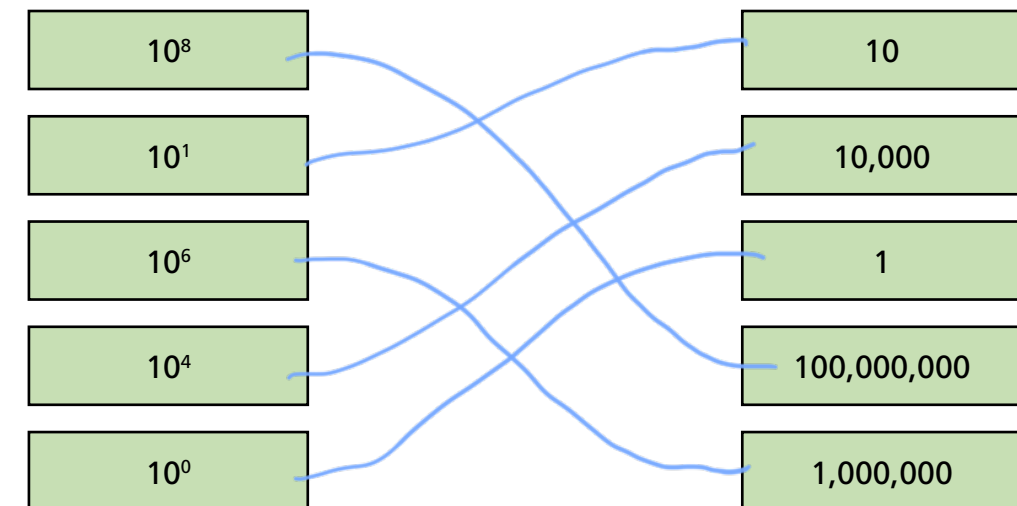
6 What is the value of the 1 in each number?

a) 10^7 Ten million

b) 10^3 One thousand

c) 10^9 One billion

7 Write these numbers in ascending order.

10^4		One hundred thousand

One billion

10^3

$1,000^2$

Ten million

One hundred

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

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

_10^{15}_

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

Write a trillion as an ordinary number. _1,000,000,000,000_

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? _10^{12}_

b) How many times greater is an octillion than a septillion? _10^3_

11 a) Write $10^3 \times 10^2$ as a single power of 10 _10^5_

b) Explain your method.

$10^3 = 1,000$ $10^2 = 100$ $1,000 \times 100 = 100,000$

_$100,000 = 10^5$_

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 × 10^n

H

1 Complete the statements and then continue the pattern.

a) $30 = 3 \times \boxed{10}$

b) $300 = 3 \times 10 \times \boxed{10} = 3 \times 10^{\boxed{2}}$

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

d) $30,000 = \underline{3 \times 10 \times 10 \times 10 \times 10 = 3 \times 10^4}$

e) $300,000 = \underline{3 \times 10 \times 10 \times 10 \times 10 \times 10 = 3 \times 10^5}$

f) $3,000,000 = \underline{3 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 3 \times 10^6}$

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
7×10^6	15×10^8
8×10^3	$50,000$
6×10	5×8^{10}

Write two more numbers in each column.

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

a) $800 = \boxed{8} \times 10^2$

c) $20 = \boxed{2} \times 10$

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

d) five million = $\boxed{5} \times 10^6$

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

a) $5,000 = 5 \times 10^{\boxed{3}}$

c) $4,000,000,000 = 4 \times 10^{\boxed{9}}$

b) $100,000 = 1 \times 10^{\boxed{5}}$

d) Seven billion = $7 \times 10^{\boxed{9}}$

5 Write these as ordinary numbers.

a) $8 \times 10^6 = \underline{8,000,000}$

b) $1 \times 10^8 = \underline{100,000,000}$

c) $9 \times 10^5 = \underline{900,000}$

6 Write these numbers in standard form.

a) $900 = \underline{9 \times 10^2}$

b) $30,000,000 = \underline{3 \times 10^7}$

c) $60 = \underline{6 \times 10}$

d) fifty thousand = $\underline{5 \times 10^4}$

e) $40,000 \times 10 = \underline{4 \times 10^5}$

f) $1,000 \times 7,000 = \underline{7 \times 10^6}$

g) $200 \times 300 = \underline{6 \times 10^4}$

7

Eva: 4 x 10⁷ is smaller than 6 x 10⁵ because 4 is smaller than 6

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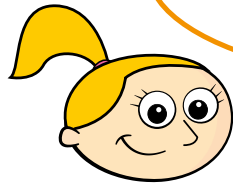
Dexter: I don't think you are correct. I think the powers are important.
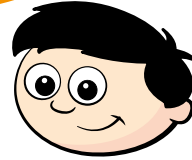
Who is correct? _Dexter_

Explain your answer.

$4 \times 10^7 = 40,000,000 \qquad 6 \times 10^5 = 600,000$

$4 \times 10^7 > 6 \times 10^5$

8 Circle the greatest number.

⟨4 × 10⁶⟩   7 × 10⁴

4×10^6 7×10^4

Explain your answer.

$4,000,000 > 70,000$

9 Find the range of these numbers.

3×10^5 7×10^4 8×10^2 7×10^5

699,200

10 The table shows information about planets.

	Radius (in metres)		Mass (in kg)
	Standard form	Ordinary form	Standard form
Mercury	2×10^6	2,000,000	3×10^{23}
Venus	6×10^6	6000000	5×10^{24}
Earth	7×10^6	7,000,000	6×10^{24}
Mars	3×10^6	3000000	6×10^{23}
Jupiter	7×10^7	70,000,000	2×10^{27}
Saturn	6×10^7	60,000,000	6×10^{26}
Uranus	3×10^7	30000000	9×10^{25}
Neptune	2×10^7	20,000,000	1×10^{22}

a) Complete the table.

b) Which planet has the greatest radius?

Jupiter

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

Neptune, Mercury, Mars, Venus, Earth, Uranus, Saturn, Jupiter

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

What is the smallest possible radius of Saturn?

55,000,000 m

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	$10 \times 10 \times 10 \times 10 \times 10$	100,000
10^4	$10 \times 10 \times 10 \times 10$	10,000
10^3	$10 \times 10 \times 10$	1,000
10^2	10×10	100
10^1	10	10
10^{-1}	$1 \div 10$	0.1
10^{-2}	$1 \div 10 \div 10$	0.01
10^{-3}	$1 \div 10 \div 10 \div 10$	0.001
10^{-4}	$1 \div 10 \div 10 \div 10 \div 10$	0.0001
10^{-5}	$1 \div 10 \div 10 \div 10 \div 10 \div 10$	0.00001

What patterns can you see?

When the power increases/decreases by 1 the answer is ten times greater/smaller.

2 Write these numbers in the form 10^n

a) $0.0001 = \underline{1 \times 10^{-4}}$

b) $0.1 = \underline{1 \times 10^{-1}}$

c) $0.000\,01 = \underline{1 \times 10^{-5}}$

d) $0.000\,001 = \underline{1 \times 10^{-6}}$

e) $0.000\,000\,000\,01 = \underline{1 \times 10^{-11}}$

f) one ten thousandth $= \underline{1 \times 10^{-4}}$

3 Write these powers of 10 as ordinary numbers.

a) $10^{-2} = \boxed{0.01}$

b) $10^{-5} = \boxed{0.00001}$

c) $10^{-8} = \boxed{0.00000001}$

4

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

Is Whitney correct? __NO__

Explain your answer.

_$10^{-4} = 0.0001$ $10^2 = 100$_

_$0.0001 < 100$_

5 Write < or > to make these statements correct.

a) 10^{-2} $<$ 10^2

b) 10^7 $>$ 10^4

c) 10^{-8} $<$ 10^{-6}

d) 10^8 $>$ 10^6

e) 10^{-7} $<$ 10

f) 10^5 $=$ 10^5

g) 10^{-14} $<$ 10^{-13}

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 $\boxed{10^3}$

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

Write a millionth as a power of 10

10^{-6}

b) A quintillionth can be written as 0.000000000000000001

Write a quintillionth as a power of 10

10^{-18}

8 Here are some number cards.

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

B	D	F
10^{-6}	$1 \div 10,000$	$1,000 \div 100,000,000$

Put the number cards in ascending order.

E, B, F, D, A, C

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

10^{-1}

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

10^2

10 Solve the equation.

Write your answer as a power of 10

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

10^5

Write decimals in the form $A \times 10^n$

H

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

a) $0.0004 = \boxed{4} \times 10^{\boxed{-4}}$

b) $0.7 = \boxed{7} \times 10^{\boxed{-1}}$

c) $0.000\ 002 = \boxed{2} \times 10^{\boxed{-6}}$

d) $0.000\ 000\ 000\ 03 = \boxed{3} \times 10^{\boxed{-11}}$

2 Write these as ordinary numbers.

a) $8 \times 10^{-5} = \underline{0.00008}$

b) $5 \times 10^{-8} = \underline{0.00000005}$

c) $6 \times 10^{-3} = \underline{0.006}$

d) $5 \times 10^{-1} = \underline{0.5}$

3 Write these numbers in standard form.

a) $0.0009 = \underline{9 \times 10^{-4}}$

b) $0.000\ 003 = \underline{3 \times 10^{-6}}$

c) five tenths $= \underline{5 \times 10^{-1}}$

d) two hundredths $= \underline{2 \times 10^{-2}}$

e) $6 \div 100{,}000 = \underline{6 \times 10^{-5}}$

f) $0.000\ 004 \times 100 = \underline{4 \times 10^{-4}}$

g) $0.02^3 = \underline{8 \times 10^{-6}}$

h) nine billionths $= \underline{9 \times 10^{-9}}$

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

a)

| 4×10^{-3} | 6×10^{-3} | 8×10^{-3} |

The power of 10 is the same the integer is different.

b)

| 5×10^{-4} | 5×10^{-3} | 5×10^{-6} |

The integer is the same, the power of 10 is different.

c)

| 8×10^{3} | 8×10^{-3} |

The integer is the same, one has a positive power of 10 the other is negative.

5 Solve the equations.

Give your answers in standard form.

a) $100g = 9$ $g = \underline{\ 9 \times 10^{-2}\ }$

b) $4 = 10{,}000b$ $b = \underline{\ 4 \times 10^{-4}\ }$

c) $6 = 2{,}000p$ $p = \underline{\ 3 \times 10^{-3}\ }$

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}, $\underline{\ 5 \times 10^{-4}\ }$, $\underline{\ 6 \times 10^{-5}\ }$, $\underline{\ 7 \times 10^{-6}\ }$,

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.

$\underline{\ 3 \times 10^{-1}\ }$

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?

$\boxed{625}$

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.

$\underline{\text{E.g.}\ \ 5 \times 10^{-2},\ 8 \times 10^{-2},\ 9 \times 10^{-2},\ 1 \times 10^{-1},\ 4 \times 10^{-1}}$

Is it possible to find more than one solution?