West Kirby Grammar School

11+ Familiarisation

Mathematics

Saturday 26th June 2021
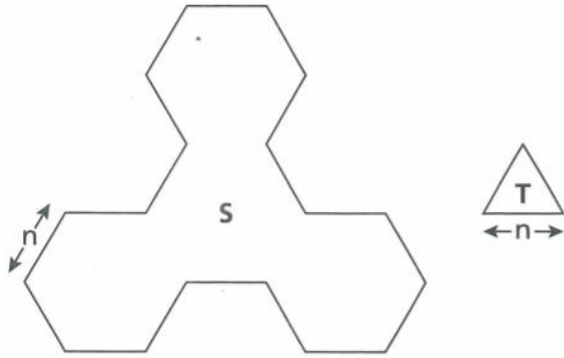
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Section 1 – Shape

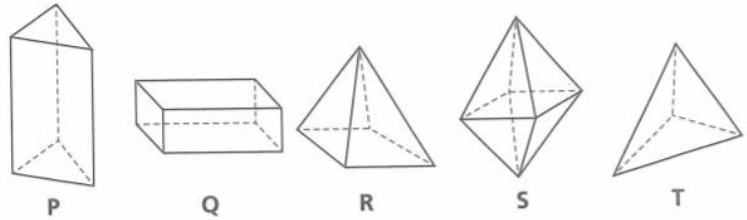Examples – please use the space below to make a note of any top tips from the examples shown.

Your turn...

Shape S is made from four regular hexagons. T is an equilateral triangle.
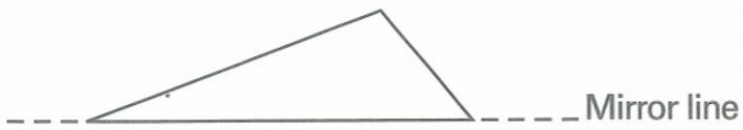

How many times will shape T fit into shape S?

A 6 B 18 C 20 D 24 E 30

Which two solids have the same number of edges?

A P and R B Q and S C R and T D P and S E P and Q

Tom has drawn a triangle.
He reflects it in the mirror line.

Mirror line

He ends up with a quadrilateral.
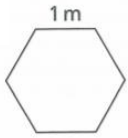
What type of quadrilateral is it?

A parallelogram
B kite
C trapezium
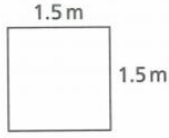D rhombus
E rectangle

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A rectangle has an area of 54 cm².

If two of the sides are each 6 cm long, what is the length of each of the other two sides?

A 6 cm   B 5.4 cm   C 9 cm   D 5 cm   E 8 cm
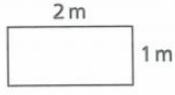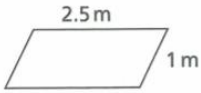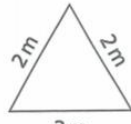
Four of the shapes above have the same perimeter.

Which shape has a different perimeter from the others?

A A   B B   C C   D D   E E
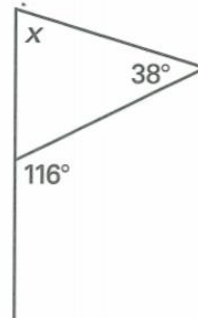
What is the size of angle x?

A 71°   B 26°   C 78°   D 54°   E 66°
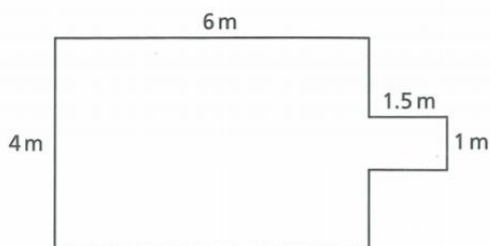
This is a plan of a hallway.

What area of carpet will be needed to cover it?

A 24 m²   B 30 m²   C 29 m²   D 25.5 m²   E 22.5 m²

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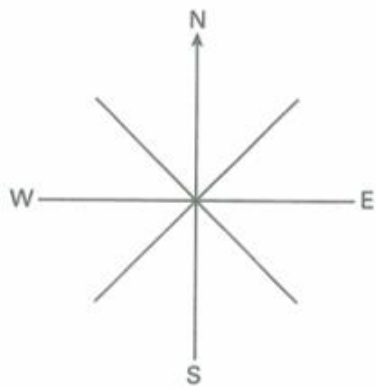
Anita is facing NW.
She then turns anti-clockwise through 585°.

Which direction does she now face?

A E   B N   C NE   D SE   E S
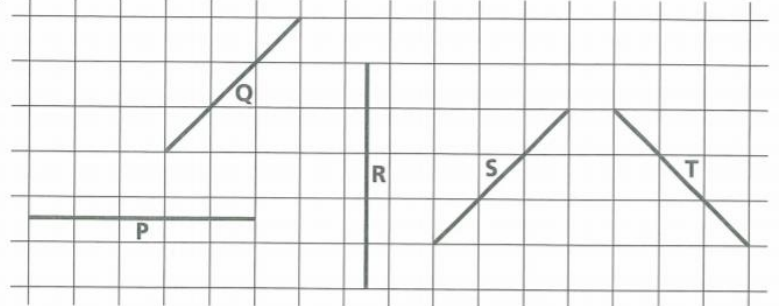
Which of these statements is correct?

A Line P is a vertical line.
B Line R is a horizontal line.
C Line Q is perpendicular to line P.
D Line S is parallel to line T.
E Line T is perpendicular to line Q.

Which of these words has a vertical line of symmetry?

TOT
ON
BIB
OF
BE

A TOT   B ON   C BIB   D OF   E BE

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Section 2 – Problem solving

Here are our top tips….

- Don't panic!

- Rule out the obvious wrong answers

- You have all the knowledge you need to do the question - you just need to figure out how to apply it. The exam setters wouldn't give you a question if you hadn't already learnt everything you need to solve it.

- If it's taking too long skip it and come back later

- If you're still not sure just guess!

1. Example
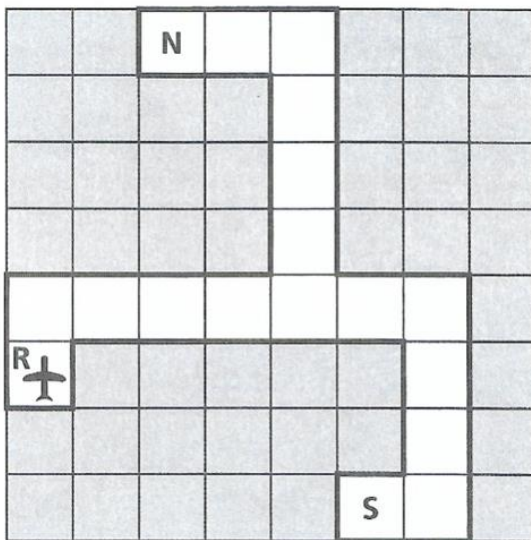
At the airport, Ground control must guide a plane from the end of the runway, point R, to the North terminal, point N

The plane can only move FORWARD, TURN LEFT 90° or TURN RIGHT 90°.

Which set if instructions will guide the plane from the runway (R) to the North terminal (N)?

A FORWARD 1, TURN RIGHT 90°, FORWARD 6, TURN RIGHT 90°, FORWARD 3, TURN RIGHT 90°, FORWARD 1

B FORWARD 1, TURN RIGHT 90°, FORWARD 4, TURN LEFT 90°, FORWARD 4, TURN LEFT 90°, FORWARD 2

C FORWARD 1, TURN LEFT 90°, FORWARD 4, TURN LEFT 90°, FORWARD 4, TURN RIGHT 90°, FORWARD 2

D FORWARD 1, TURN RIGHT 90°, FORWARD 6, TURN LEFT 90°, FORWARD 3, TURN RIGHT 90°, FORWARD 1

E FORWARD 1, TURN RIGHT 90°, FORWARD 4, TURN RIGHT 90°, FORWARD 4, TURN RIGHT 90°, FORWARD 2

2. Example
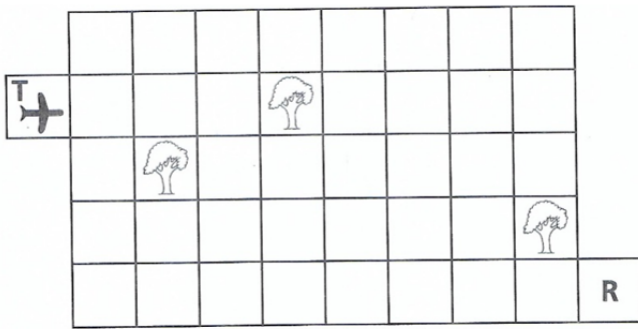
At the airport, Ground control must guide a plane from point T to the beginning of the runway, R, ready to take off, avoiding any trees on the way.

The plane can only move FORWARD, TURN LEFT 90° or TURN RIGHT 90°.

Which set if instructions will guide the plane to the runway avoiding any trees?

A FORWARD 3, RIGHT 90°, FORWARD 2, LEFT 90°,   FORWARD 5

B FORWARD 1, LEFT 90°, FORWARD 2, RIGHT 90°, FORWARD 7

C FORWARD 3, RIGHT 90°, FORWARD 3, LEFT 90°, FORWARD 6

D FORWARD 1, RIGHT 90°, FORWARD 2, LEFT 90°, FORWARD 7

E FORWARD 3, LEFT 90°, FORWARD 3, LEFT 90°, FORWARD 6

3. Example

Hanif will be 17 years old, 7 years from now.

How old was he 7 years ago?

A 3

B 6

C 7

D 8

E 10

4. Have a go!

In five years' time, Peter's cat will be 12 years old

How old was his cat six years ago?

A 13

B 23

C 7

D 5

E 1

5. Example

3	6	9
6	?	12
9	12	15

This is a 'magic square' where the numbers in the rows and columns follow a logical sequence

What is the missing number?

A 15

B 3

C 9

D 12

E 6

6. Have a go!

84	96	108
96	108	120
108	120	?

This magic grid contains number sequences that increase in steps.

What is the missing number?

A 108

B 132

C 96

D 120

E 84

7. Example

On day 1, 4 people are sent an email.

On day 2, each of the 4 send it to 4 more people, and so on

Each person send the email just once

How many people have received the email by day 4?

A 64

B 256

C 84

D 340

E 240

8. Have a go!

In 2015, 53 children went on a school trip

In 2016, twice as many went as in 2015

In 2017, twice as many went as in 2016

How many children went in 2017

A 203

B 106

C 309

D 159

E 212

9. Have a go!

$$81 \cdot 3 - 16 \cdot \boxed{} 9 =$$

$$6 \boxed{} \cdot 81$$

Gemma's calculator displays the sum entered and the answer.

The calculator works correctly except that one digit always appears as a blank space.

What is the missing digit?

A 7

B 4

C 0

D 2

E 5

10. Have a go!

The kitchen clock says 5 o'clock

What is the smaller angle between the clock hands

A 135°

B 155°

C 150°

D 165°

E 130°

11. Have a go!

The school clock is put right on Monday at 11:00 a.m.

At 11.00 a.m. on Tuesday it gives the time as 11.02 a.m.

How much time does the clock gain every hour?

A 1 minute

B 15 seconds

C 5 seconds

D 2 minutes

E 10 seconds

12. Have a go!

Look at the grid in which there are some empty squares.

When every square is filled in, each row and each column adds up to 31.

Which number should be in the square with the question mark?

A 13

B 6

C 12

D 3

E 10

13. Have a go!

Lollipops cost the same as sherbet dips.

Sherbet dips cost twice as much as jelly rings.

Four of the following cost the same.

Which does not cost the same as the rest?

A 3 sherbet dips, 2 jelly rings, 1 lollipop

B 2 lollipops, 2 sherbet dips, 2 jelly rings

C 3 sherbet dips, 2 lollipops

D 2 lollipops, 4 jelly rings, 2 sherbet dips

E 1 lollipop, 6 jelly rings, 1 sherbet dip

14. Have a go!

Joshua and Emma each start to grow a plant on the same day.

After one week, both plants are 5 centimetres tall.

During the next three weeks, Joshua's plant grows 4 centimetres per week and Emma's grows 4.5 centimetres per week.

When the plants are four weeks old, how much taller is Emma's plant than Joshua's, in centimetres?

A 6.0 cm

B 5.5 cm

C 4.0 cm

D 2.0 cm

**E** 1.5 cm

15. Have a go!

Balbir wants to guide a robot along the white squares through this maze.

The robot starts on the square marked 'Entrance' and must finish on the square marked 'Exit'.

It can only move FORWARD, TURN RIGHT 90° and TURN LEFT 90°.

Which instructions will guide the robot through the maze?

A FORWARD 4, TURN LEFT 90°, FORWARD 2, TURN RIGHT 90°, FORWARD 3, TURN RIGHT 90°. FORWARD 5

B FORWARD 3, TURN RIGHT 90°, FORWARD 1, TURN RIGHT 90°, FORWARD 3, TURN LEFT 90°. FORWARD 3

C FORWARD 3, TURN LEFT 90°, FORWARD 1, TURN RIGHT 90°, FORWARD 2, TURN RIGHT 90°. FORWARD 4

D FORWARD 3, TURN RIGHT 90°, FORWARD 1, TURN LEFT 90°, FORWARD 2, TURN LEFT 90°. FORWARD 4

E FORWARD 3, TURN LEFT 90°, FORWARD 1, TURN RIGHT 90°, FORWARD 3, TURN RIGHT 90°. FORWARD 4
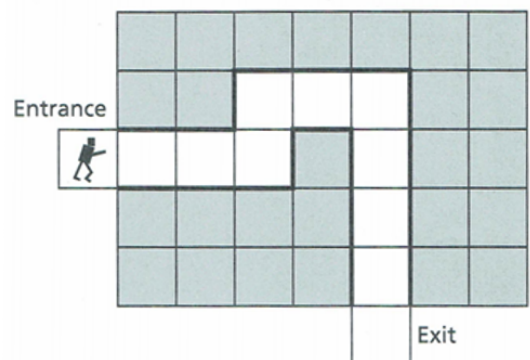
16. Have a go!

What is the fifth term in this sequence?

319   193   67   …   …

A -175

B -69

C -185

D -59

E -101

17. Have a go!

Two coaches are booked for the school trip.

The first coach seats 56 passengers, and the second 43.

8 adults, 41 boys and 38 girls are going on the trip.

How many spare seats will there be?

A 11

B 48

C 35

D 12

E 20

18. Have a go!

Five parking spaces are being marked out along the roadside.

An average car is 4m long.

Allowing an extra 1.5m per car for driving into the space, roughly how long should the spaces be altogether?

A 0.25 km

B 28 m

C 35 m

D 25 m

E 0.20 km

Section 3 – Number, time, money

Examples

1. What fraction of 2 hours is 45 mins?
   - A. 2/3
   - B. 6/8
   - C. 2/45
   - D. ¾
   - E. 3/8

2. Ravi earns £35.50 from his weekly paper round. He is paid at the end of each week. If he saves all the money, how many weeks must he work before he can buy a mobile costing £150?
   - A. 5
   - B. 6
   - C. 7
   - D. 8
   - E. 9

3. On a holiday, Mr Baker buys some perfume for 30 dollars and a book for 9 dollars. He calculates that the perfume cost £20.00 and the book cost £6.00. How much would a 15-dollar t-shirt cost in pounds?
   - A. £9.00
   - B. £10.00
   - C. £11.00
   - D. £12.00
   - E. £13.00

4. I bought 8 small packets of sweets. I was given £2.40 change from £10. How much each packet cost?
   - A. 96p
   - B. 85p
   - C. 86p
   - D. 95p
   - E. 30p

5. The price of game in the local toyshop has been reduced by 20%. The original price was £9.50.
   How much is it now?

   A. £1.90
   B. £7.50
   C. £7.60
   D. £8.55
   E. £9.30

6. Mr Cooper compares the price of the same window blinds at five shops.
   Which shop gives the cheapest cost per blind?

Shop	Cost
A	50% off £89
B	25% off £60
C	£49
D	4 for £179
E	3 for £140

7. A newspaper showed temperatures in 12 cities on a day in December.

London 5°C   Glasgow -3°C
Newcastle -6°C   Birmingham 4°C
Cardiff 6°C   Edinburgh -7°C
Leicester 3°C   Leeds -4°C
Southampton 7°C   Manchester -1°C
Liverpool 2°C   York -5°C

Which was the coldest?

A. Manchester

B. Glasgow

C. York

D. Edinburgh

E. Newcastle

8. Mr Sohal is looking at the effect of temperature.
He repeats the same experiment several times.
Each time, the temperature is 4°c cooler than the previous time. He did the first experiment at 25°c.
At what temperature did he carry out his eighth experiment?

A. -3°c
B. 0°c
C. -7°c
D. 1°c
E. -5°c

Your turn…

1. David has keyboard lessons which cost £20.50 each week.
   He has three 12 weeks terms.
   What is the total cost of his lesson in a year?

   A. £492

   B. £205

   C. £287

   D. £246

   E. £738

2. The Hassan family as two pints of milk delivered every day.

   Milk costs 41p for a pint.

   What is their weekly milk bill?

   A. £5.60

   B. £2.05

   C. £6.04

   D. £4.92

   E. £5.74

   F.

3. John and his sister Debra held a cake sale at their school to raise money for charity.
   They sold 48 large cakes at 10p each and 65 small cakes at 5p each.
   How much money did they make?

   A. £8.05
   B. £37.30
   C. £11.30
   D. £5.65
   E. £80.50

4. Batteries cost 89p each.

    How much do 7 batteries cost?

    A. £7.83
    B. 96p
    C. £5.63
    D. £6.23
    E. £6.41

5. Today's temperature is 3°c.

    Yesterday, it was -4°c.

    What is the difference between these two temperatures?

    A. 1°c
    B. -1°c
    C. 7°c
    D. -7°c
    E. -4°c

6. Mrs Patel spent £11.60 on 40 busy lizzie plants.

    What was the cost of each plant?

    A. 76p
    B. 29p
    C. 40p
    D. £2.90
    E. 2.9p

7. Sarah's mum buys her a new school skirt in a sale at half price.

    The original cost of the skirt was £9.50.

    How much change does Sarah's mum get from her £10 note?

    A. 25p
    B. 50p
    C. £4.50
    D. £4.75
    E. £5.25

8. Year 6 are all going on a day trip to France.
   There are 33 children in year 6 and the trip costs £25 each.
   How much money must be collected in total from the children?
   - A. £58
   - B. £82.50
   - C. £150
   - D. £580
   - E. £825

9. Mr Miller's supermarket bill is £17.03.
   At the checkout, he uses some vouchers to reduce his bill by £1.45.
   What is the new amount he has to pay?
   - A. £16.68
   - B. £15.68
   - C. £16.42
   - D. £15.58
   - E. £16.02

10. A Greek holiday costs £375 per person. There is a £60 reduction for each child.
   How much would it cost Mr and Mrs Johnson to go on holiday and take their three children with them?
   - A. £1380
   - B. £1320
   - C. £1815
   - D. £1695
   - E. £1440

Section 4 – Number

Starter

1) Which of the following is closest in value to 1?

A 1.1   B 0.98   C 0.9   D 1.09   E 1.9

2) Which of the following is closest to 888.88 + 88.8 + 8.88 + 0.88?

A 975   B 1000   C 998   D 990   E 968

3) Which of the following is closest to 53?

A 52.09   B 52.90   C 53.1   D 53.01   E 53.11

4) Which of the following is closest to 66.6 + 6.66 + 0.66?

A 74   B 70   C 79   D 83   E 68

12 345

The 2 in this number is worth 2000.

What is the 3 worth?

A 3000   B 30   C 12 300   D 3   E 300

Which of these numbers has the smallest value?

A 1.01   B 0.99   C 0.02   D 1.25   E 0.5

Out of a class of 36 children, 17 have younger brothers and sisters.

Approximately what proportion is this?

A ½   B ⅔   C ¼   D ⅗   E ⅜

There are 200 pupils at a school sports day.
⅖ of them run in the relay race.

How many pupils run in the race?

A 100   B 40   C 50   D 80   E 25

Iva plants 216 seedlings.
³⁄₈ of them are killed by frost.

How many seedlings survive?

A 178   B 135   C 133   D 81   E 82

Which number is divisible by both 5 and 10?

A 5   B 25   C 32   D 40   E 55

Which answer has three numbers that are all multiples of 3 or 4?

A 8, 9, 10
B 9, 10, 12
C 8, 12, 16
D 12, 14, 16
E 14, 15, 16

Which fraction has the largest value?

A ½   B ¾   C ⅝   D ¹⁰⁄₁₂   E ⅘

Which fraction is equivalent to $^{20}/_{32}$?

A $^{5}/_{8}$ B $^{12}/_{16}$ C $^{4}/_{10}$ D $^{6}/_{8}$ E $^{8}/_{5}$

These are the months of the year:

January   February   March   April   May   June   July

August   September   October   November   December

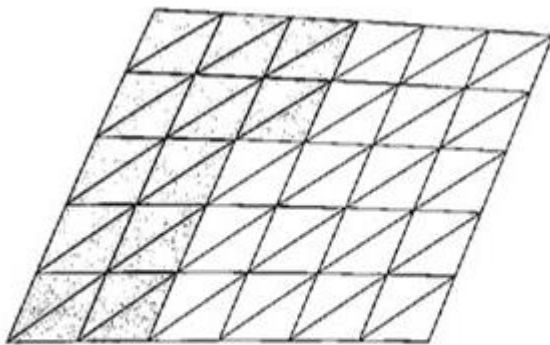What percentage of the months begin with J?

A 12%   B 3%   C 30%   D 25%   E 20%

What percentage of this grid is shaded?
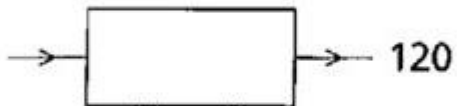
A 40%   B 24%   C 30%   D 20%   E 48%
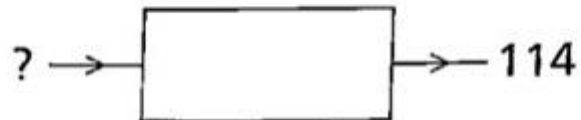
This machine multiplies by 3 and then subtracts 6.

Which number has been put in?

A 84   B 42   C 82   D 48   E 36

This machine doubles and then adds 2.

? → □ → 114

Which number has been put in?
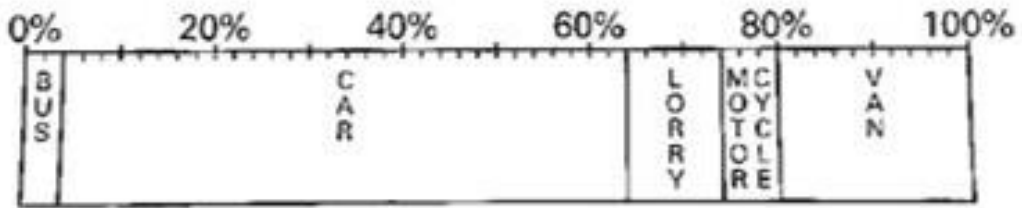
A 57   B 59   C 52   D 54   E 56

Which answer has three numbers that are all cube numbers?

A 8, 16, 32
B 8, 27, 64
C 16, 32, 64
D 9, 27, 64
E 5, 25, 125

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Thomas walks to school each day.
One morning he recorded the types of vehicle that passed him.
He drew this chart to show the data.

50 vehicles passed him altogether.

How many more cars were there than all other vehicles added together?

A 12   B 20   C 6   D 10   E 14

# Section 5 – Estimating and converting weights and volumes

Tips

1. Compare the items in the question with items you already know. For example, if you know that a milk carton holds roughly 2 litres of liquid then a teacup will hold less than 500ml.
2. Process of elimination:
   a. Questions like to trip you up by giving options in the wrong units, so make sure to check it is in the units the question asks for.
   b. Check if each option is relevant to the item size, if the option is obviously wrong then you can ignore it.
3. Check if your answer makes sense; your final answer should be suitable for what the question is asking.
4. Check what type of conversion the question requires:
   a. Length
   b. Area
   c. Volume
5. Some timing tips:
   a. The paper you will sit is roughly 45-60mins
   b. So, aim to spend around 45 seconds to 1 minute on each question.
6. If you feel the question will take too long, skip the question and come back to it later.

Some useful items

Feather – 1g
Battery – 25g
Can of beans – 250
Bag of sugar – 1kg
Bag of flour – 2kg

Person – 60-70kg
Car – 2000kg
Bottle of coke – 500ml
Cup of tea – 250ml
Milk carton – 2l

Method for conversions
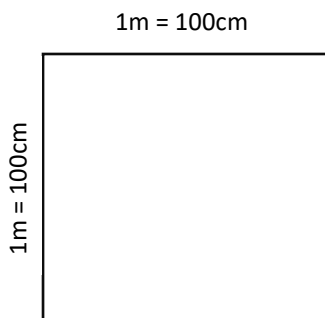
1m = 100cm

1m = 100cm

The area of the square in metres is 1m x 1m

So in centimetres:

100cm x 100cm = 10000cm^2

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Example 1

- Which container will hold about 5 litres?
    - A a teapot
    - B a bucket
    - C a milk bottle
    - D a teacup
    - E a teaspoon

- You know that this milk bottle contains about 2 litres.
- A teacup is far too small
- A teaspoon is even smaller!
- Comparing a teapot to a milk bottle which is smaller?
- So the answer must be B a bucket!!

Example 2

- Which of the following is the most likely weight of a bag?
    - A 2g
    - B 2 litres
    - C 2000kg
    - D 200mm
    - E 2kg

First check the units – B and D are NOT measurements of weight.

A pencil weighs about 3g so not A

A person weighs roughly 60-70kg, C is bigger than a person.

So the final answer is E

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Example 3

- A medium-sized teapot holds just enough for four cups of tea.
- Which of these is most likely to be the volume of the teapot?
  - A 2 litres
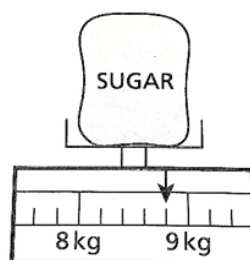 - B 0.3 litres
  - C 300ml
  - D 4 litres
  - E 800ml

You know that a milk carton contains around 2 litres. So a teapot is not likely to contain 2 litres. So A is not the answer.
Therefore, clearly D is also not the solution.
A teacup holds about 150-200ml so C is not an option
since the teapot holds 4 cups of tea.
And since B is also equal to 300ml the answer must be E
= 200x4

Example 4

- The arrow shows how much the sack of sugar weighs.
- If another 600g of sugar are added what will the total weight be?
- A 9.4kg
- B 9.0kg
- C 9.2kg
- D 9.6kg
- E 8.6kg

First work out how much each division is worth.

Then find how much the scale shows

Then add on the 600g from the question
And finally convert to kg

1kg = 1000g

$\dfrac{1000g}{5} = 200g$

Therefore each division is worth 200g
8kg = 8000g
8000+800 = 8800g
8800+600 = 9400g
$9400g = \dfrac{9400}{1000} = 9.4kg$

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Practise Question 1

Claire packed her rucksack for a day's hike in the country

It contained a flask of hot tea, some sandwiches, two apples, a banana and a bar of chocolate.

She also packed some waterproof clothes.

Roughly, how much is the rucksack likely to weigh?

A 3kg   B 300g   C 30kg   D 300kg   E 3g

Practise Question 2

How many millimetres are there in 0.08km?

A 8mm   B 80mm   C 800mm   D 8000mm   E 80000mm

Practice Question 3

Mrs Morgan is 5 feet 7 inches tall.

If 1 foot is 30.5cm and 1inch is 2.5cm, which is closest to her height in metres?

A 1.3m   B 1.4m   C 2m   D 1.m   E 1.7m

Practise Question 4

Mr Jones is training for the London marathon.

He runs 8km every weekday and twice as far on Saturday and on Sunday.

How far does he run in one week?

A 40km   B 56km   C 72km   D 88km   E 104km

Practise Question 5
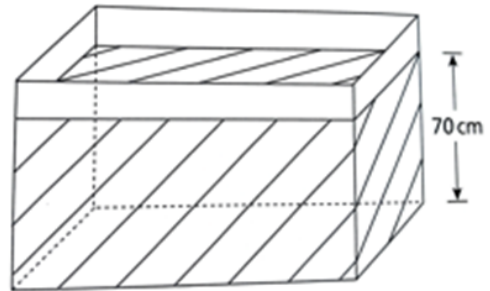
A rectangular water tank is filled to a depth of 70cm.
It contains 1050 litres of water.
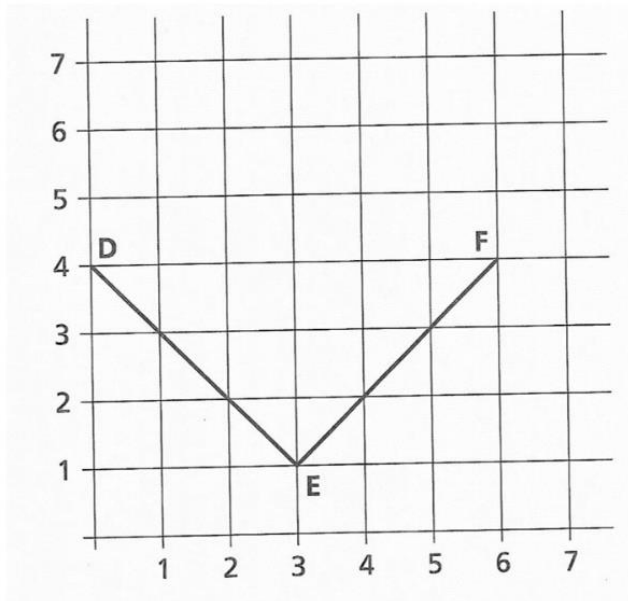Some water is taken out of the tank.
The water level drops by 25cm.

How much water is left in the tank?

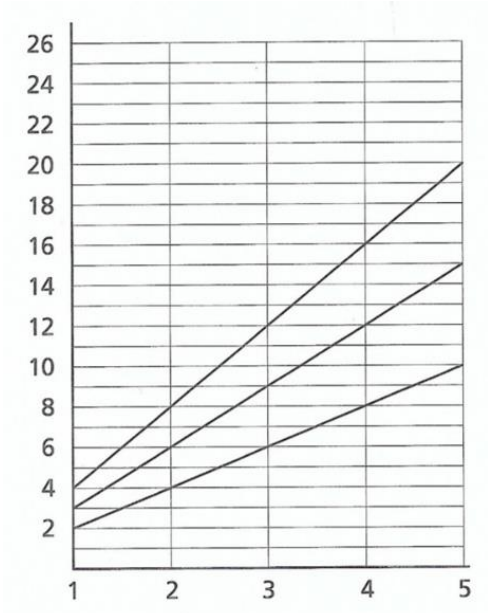A 625 litres
B 375 litres
C 525 litres
D 270 litres
E 675 litres

70cm

Section 6 – Graphs and Coordinates

When point G is added, DEFG is a square.

What are the coordinates of point G?

    A. (7 , 3)

    B. (4 , 6)

    C. (2 , 7)

    D. (3 , 7)

    E. (4 , 7)

This graph shows multiplication tables.
The three lines shown start at 2, 3 and 4.

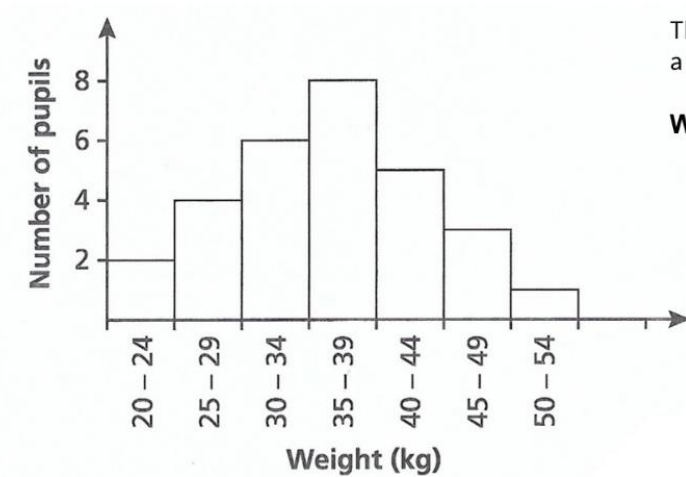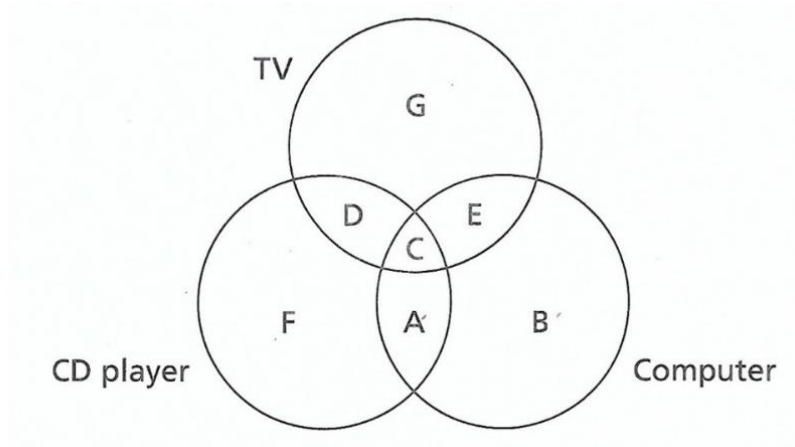**If a line starts at 5, what height will it reach on the y-axis?**

    A. 21
    B. 20
    C. 23
    D. 26
    E. 25

The three circles represent the children in a class who have TVs, CD players and computers.

Which area shows the children who do NOT have a TV?

    A. B + A + F
    B. G – B – F
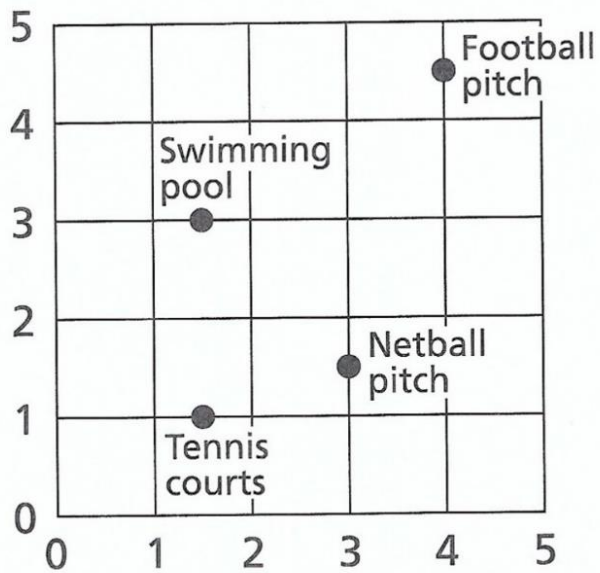   C. F + C + B
    D. A + B + D
    E. F + A + B + A

This bar chart shows the weights of pupils in a class.

What statement MUST be true?

    A. 8 children weigh between 35 kg and 39 kg.
    B. 8 children weigh more than 40 kg, but less than 45 kg.
    C. 1 child weighs exactly 55 kg.
    D. No children weigh less than 21 kg.
    E. 5 children weigh at least 45 kg, but less than 50.5 kg.

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This graph shows a sports ground.

Where is the netball pitch?

- A. (1 , 3)
- B. (3, 1 ½)
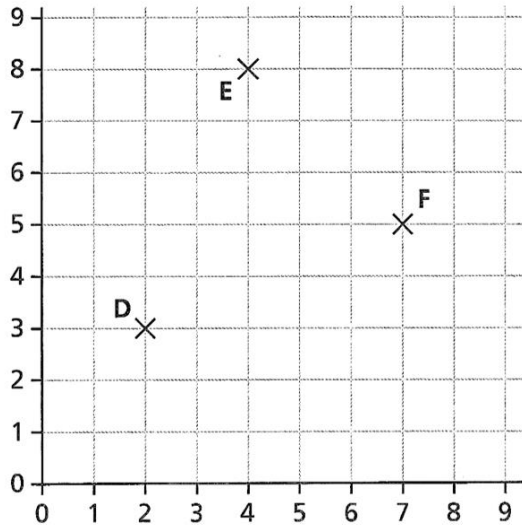- C. (3 , 1)
- D. (1 ½ , 3)
- E. (1 ½ , 3 ½)

Jack collected the following data during a survey of his year group.

100 pupils completed the survey.

How many girls gave text as their favourite way of sending messages?

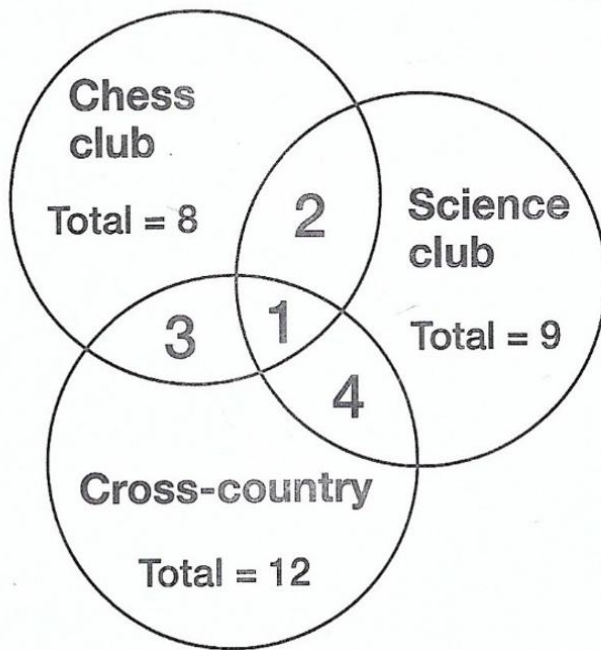- A. 36
- B. 14
- C. 10
- D. 24
- E. 4

	Favourite Message System		
	Telephone	Text	Email
Boys	10	6	28
Girls	14	?	28

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What are the coordinates of D, E and F?

A. D (3 , 2) E (8 , 4) F (5 , 7)

B. D (2 , 3) E (4 , 8) F (7 , 5)

C. D (2 , 3) E (4 , 7) F (7 , 5)

D. D (3 , 2) E (7 , 5) F (4 , 8)

E. D (3 , 2) E (4 , 8) F (5 , 7)

24 children in a class are asked what activities they do.

How many do no activities?
A. 6
B. 5
C. 4
D. 2
E. 3

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Favourite Pizza Toppings

Key: ◯ stands for 6 children	
◗ stands for 3 children	
Cheese and tomato	◯◯◯◯
Tuna and sweetcorn	◯◯◯◯◗
Hot and spicy pepperoni	◯◯
Tomato, mushroom and onion	◯◯◗
Hawaiian pineapple	◯◯◯◗

Gemma and Li did a survey on favourite pizza toppings.

How many children liked tuna and sweetcorn best?

A. 27
B. 5
C. 9
D. 4 $\frac{1}{2}$
E. 24
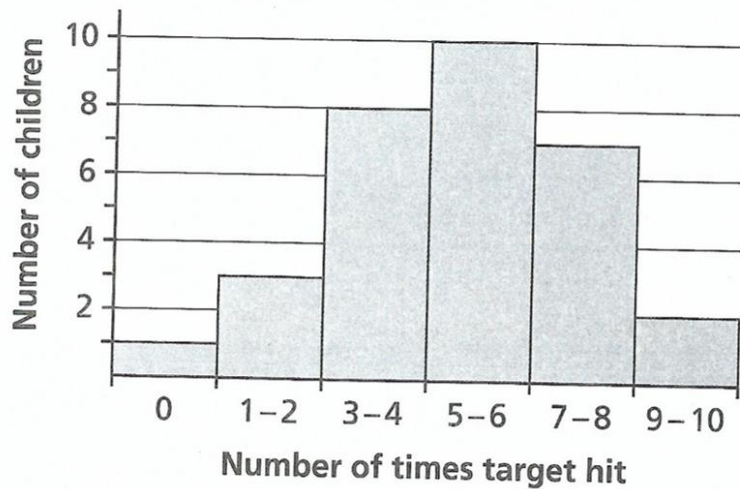
This bar chart shows how many times a class of children hit a target with a set of ten beanbags.

How many children hit the target fewer than 7 times?

A. 22
B. 29
C. 12
D. 21
E. 10