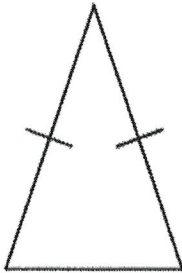


PRACTICE QUESTIONS
2026 Foundation Paper 3

These are past GCSE questions on topics that are very likely to appear in Paper 3.



- 1 Write down the mathematical name of this triangle.
Choose from the list in the box.



isosceles equilateral right-angled scalene

(2 equal sides)

.....triangle [1]

- 2 Here is a list of numbers.

6 9 2 12 3 8 3

- (a) Write down the mode. most common

(a) 3 [1]

- (b) Work out the range.

biggest - smallest = $12 - 2 =$

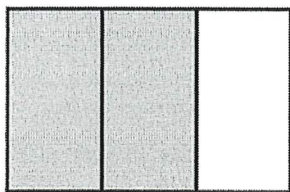
(b) 10 [2]

- 3 Write the following numbers in order of size, smallest first.

0.4 00 0.5 00 0.06 0 0.444 0.46 0

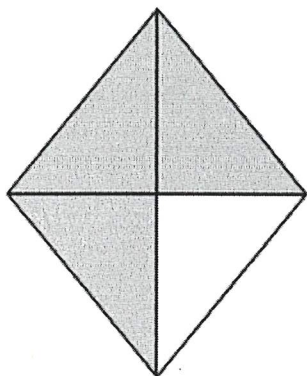
0.06 0.4 0.444 0.46 0.5 [2]
smallest

4 (a) What fraction of this shape is shaded?



(a) $\frac{2}{3}$ [1]

(b) What percentage of this shape is shaded?

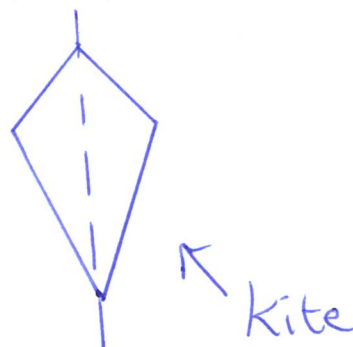
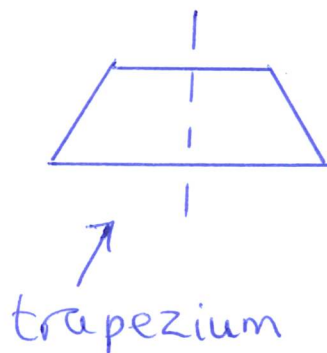


$$\frac{3}{4} =$$

(b) 75% % [1]

5 (a) Sketch a quadrilateral that has exactly one line of symmetry. [1]

examples:



(b) Write down the mathematical name of your quadrilateral.

(b) [1]

6 Decrease 650 by 40%.

$$0.6 \times 650 = 390$$

OR

$$0.4 \times 650 = 260$$
$$650 - 260 = 390$$

(c) 390 [3]

7 Put brackets into this sum so that the answer is correct.

$$1 + 2 \times (3 + 5) = 17$$

[1]

8 Here are the first four dot patterns in a sequence.

Pattern 1

Pattern 2

Pattern 3

Pattern 4

•

••

•••

••••

(a) Draw Pattern 5 in the sequence.

[1]

•••••

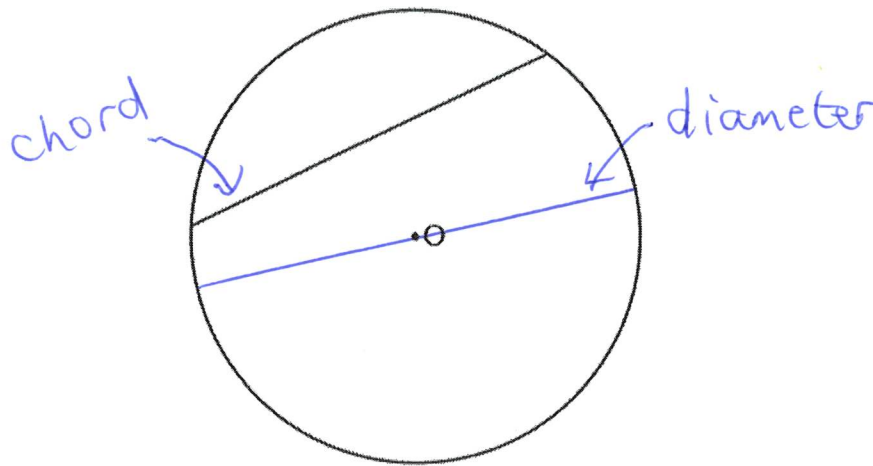
(b) Without drawing, work out how many dots are in Pattern 8 of the sequence.

Explain how you worked out your answer.

Pattern	1	2	3	4	5	6	7	8
Dots	1	3	5	7	9	11	13	15
		→	→	→	→			
		+2	+2	+2	+2			

15 ^{eg.} because every pattern has 2 more dots, so I added 6 to 9. [2]

9 The diagram shows a circle, centre O, and a line that meets the circle twice.

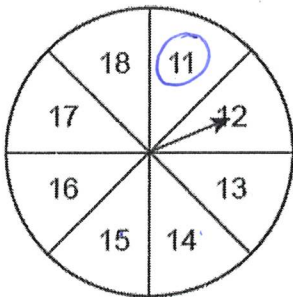


(a) On the diagram, draw a diameter. [1]

(b) Write down the mathematical name of the line shown on the diagram.

(b) chord [1]

10 A student makes a fair 8-sided spinner. They write the numbers 11, 12, 13, 14, 15, 16, 17 and 18 on the spinner.



(a) Write down the probability of the student's spinner landing on a number which is less than 12.

8 numbers
1 less than 12

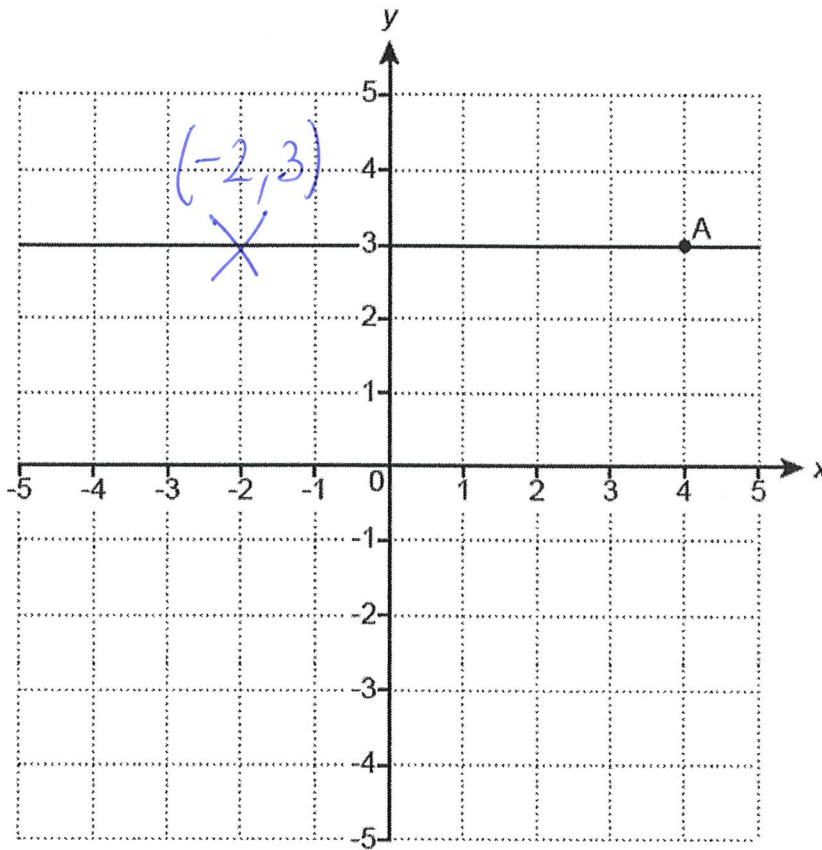
(a) $\frac{1}{8}$ [1]

(b) Find the probability of the student's spinner landing on a multiple of 3.

12, 15, 18

(b) $\frac{3}{8}$ [2]

11 This grid shows a horizontal line going through the point A.



(a) (i) Write down the coordinates of point A.

(a)(i) (.....4.....,3.....) [1]

(ii) Plot the point $(-2, 3)$.

[1]

(b) Write down the equation of the horizontal line going through point A.

(b)y = 3..... [1]

- 12 A student flips a fair coin and rolls a fair four-sided dice. The coin can land on heads (H) or on tails (T). The dice has sides numbered from 5 to 8.

(a) Complete this table to show all the possible outcomes.

		Dice			
		5	6	7	8
Coin	H	H5	H6	H7	H8
	T	T5	T6	T7	T8

[2]

- (b) Find the probability of getting a tail with an even number. Give your answer as a fraction in its simplest form.

T6, T8

$$\frac{2}{8} = \frac{1}{4}$$

(b) [2]

- 13 Ashley has these three number tiles.



Which one of Ashley's tiles shows a cube number? Write the number on the blank tile on the answer line.

cube numbers

$$1 \times 1 \times 1 = 1$$

$$2 \times 2 \times 2 = 8$$

$$3 \times 3 \times 3 = 27$$

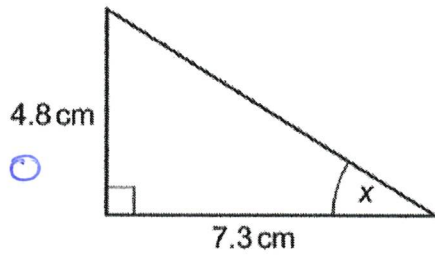
etc.

just 8



..... [1]

14 The diagram shows a right-angled triangle.



Not to scale

Calculate angle x .

T^oA $\tan x = \frac{4.8}{7.3}$

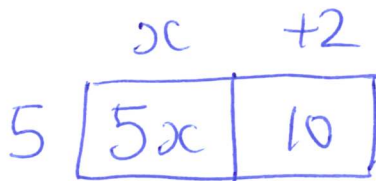
$$x = \tan^{-1}\left(\frac{4.8}{7.3}\right)$$

$$= 33.32628969 \rightarrow$$

$x = \dots\dots\dots^\circ$ [3]

15 (a) Multiply out.

$$5(x+2)$$



(a) $\dots\dots\dots 5x + 10 \dots\dots\dots$ [1]

(b) Rearrange this formula to make r the subject.

$$p = 3r - 5$$

$$+5 \quad | \quad +5$$

$$p + 5 = 3r$$

$\div 3$

$$\frac{p+5}{3} = r$$

(b) $\dots\dots\dots r = \frac{p+5}{3} \dots\dots\dots$ [2]

16 Solve.

$$\begin{aligned} \text{(a)} \quad \frac{126}{x} &= 7 \\ \times x & \quad \times x \\ 126 &= 7x \\ \div 7 & \quad \div 7 \\ 18 &= x \end{aligned}$$

$$\text{(a)} \quad x = \underline{18} \quad [1]$$

$$\begin{aligned} \text{(b)} \quad 8x - 6 &= 46 \\ +6 & \quad +6 \\ 8x &= 52 \\ \div 8 & \quad \div 8 \\ x &= 6.5 \end{aligned}$$

$$\text{(b)} \quad x = \underline{6.5 \left(\text{or } \frac{52}{8} \text{ or } \frac{13}{2} \right)} \quad [2]$$

17 Ling is paid £23.40 per hour for working on a weekday.
On a Sunday, Ling is paid at $1\frac{1}{3}$ times this hourly rate.

How much does Ling earn for working 8 hours on a Sunday?

$$1\frac{1}{3} \times 23.40 = 31.20 \text{ per hour}$$

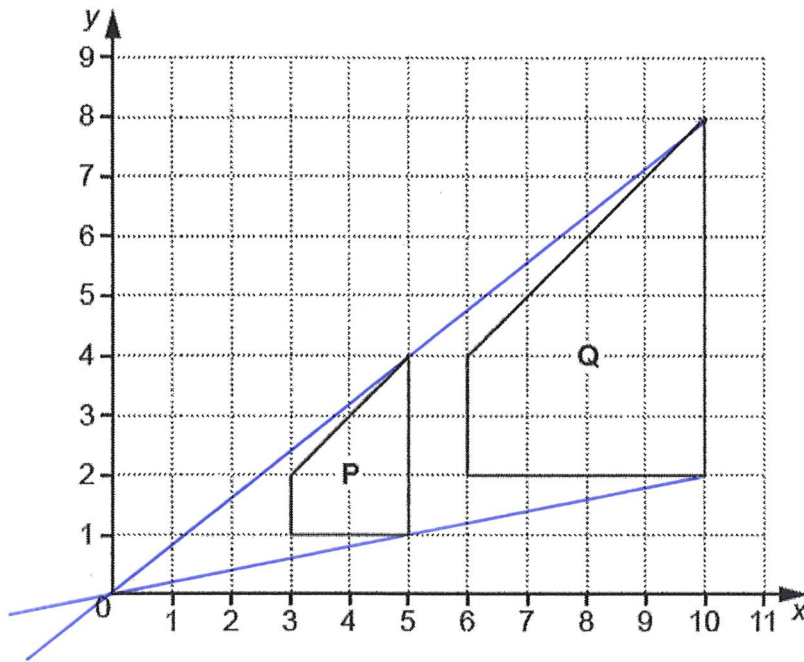
(use calculator
eg. $(1 + 1 \div 3) \times 23.40$)

$$31.20 \times 8 =$$

$$\text{£ } \underline{249.60} \quad [3]$$

↑
remember
this 0.

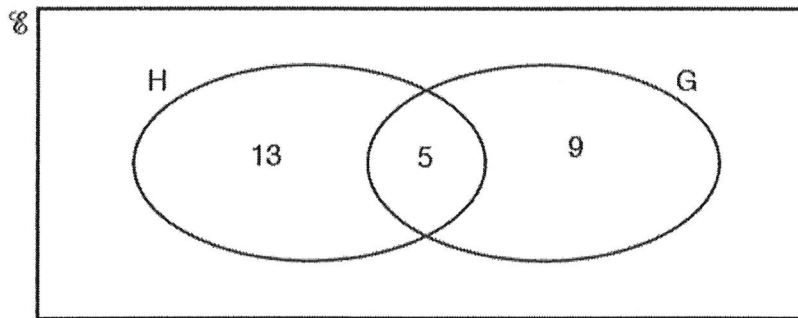
18 Two shapes are drawn on the grid below.



Describe fully the **single** transformation which maps shape P onto shape Q.

..... enlargement scale factor 2
 centre (0,0) [3]

19 (a) This Venn diagram shows the number of students in a Year 10 tutor group who study History (H) and Geography (G).



There are 29 students in the tutor group.

(i) How many students in the tutor group do not study History or Geography?

(a)(i) 5 [2]

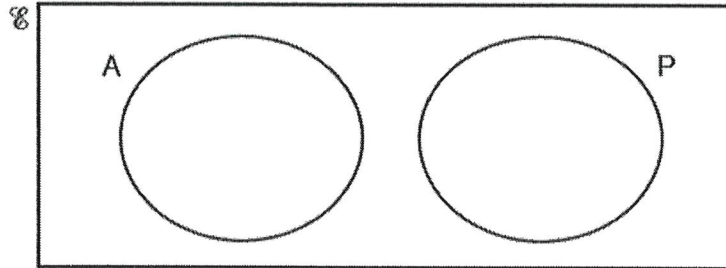
(ii) How many students in the tutor group study History?

13 + 5 = 18 [1]

- (iii) One of the 29 students is selected at random.
What is the probability that they study Geography but do not study History?

(iii) $\frac{9}{29}$ [1]

- (b) This diagram represents students in a tutor group who study Art (A) and Physics (P).



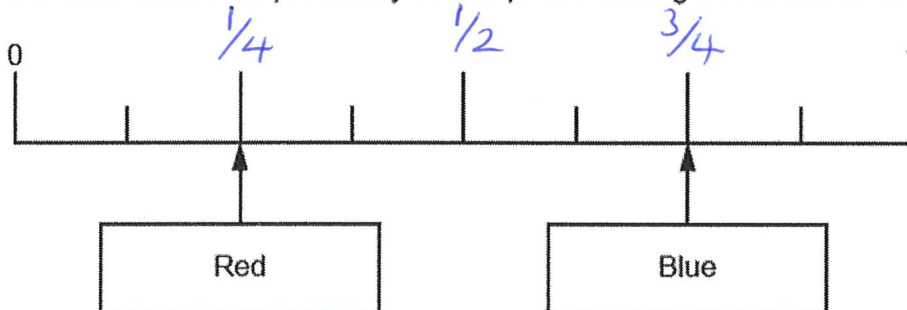
How many students study both Art and Physics?

(b) 0 [1]

(no overlap)

- 20 Each edge of a fair spinner is coloured either red or blue.

The scale shows the probability of the spinner landing on red and of landing on blue.



- (a) Write down, as a fraction, the probability of the spinner landing on red.

(a) $\frac{1}{4}$ [1]

- (b) Show that the spinner could not have 15 edges. [2]

eg. If 15 edges,
 $\text{red} = \frac{1}{4} \times 15 = 3.75$
 (impossible as it's not a whole number)

21 Mr Fox invests £400 in a savings account that pays 3% simple interest per year.

Work out the total amount of interest Mr Fox will have earned at the end of the 5th year.

$$0.03 \times 400 = \pounds 12 \text{ per year}$$

$$12 \times 5 =$$

£ 60 [2]

22 Pippa owns a snack bar.

She uses $\frac{3}{5}$ of a kilogram of spread each day.

Spread costs £3.20 for a 1 kilogram tub and £6.15 for a 2 kilogram tub.

Pippa buys enough spread to last for 14 days.

What is the lowest price Pippa can buy this spread for?
Show your working.

$$\frac{3}{5} \times 14 = 8.4 \rightarrow \text{buy } 9 \text{ kg}$$

(use calculator!)

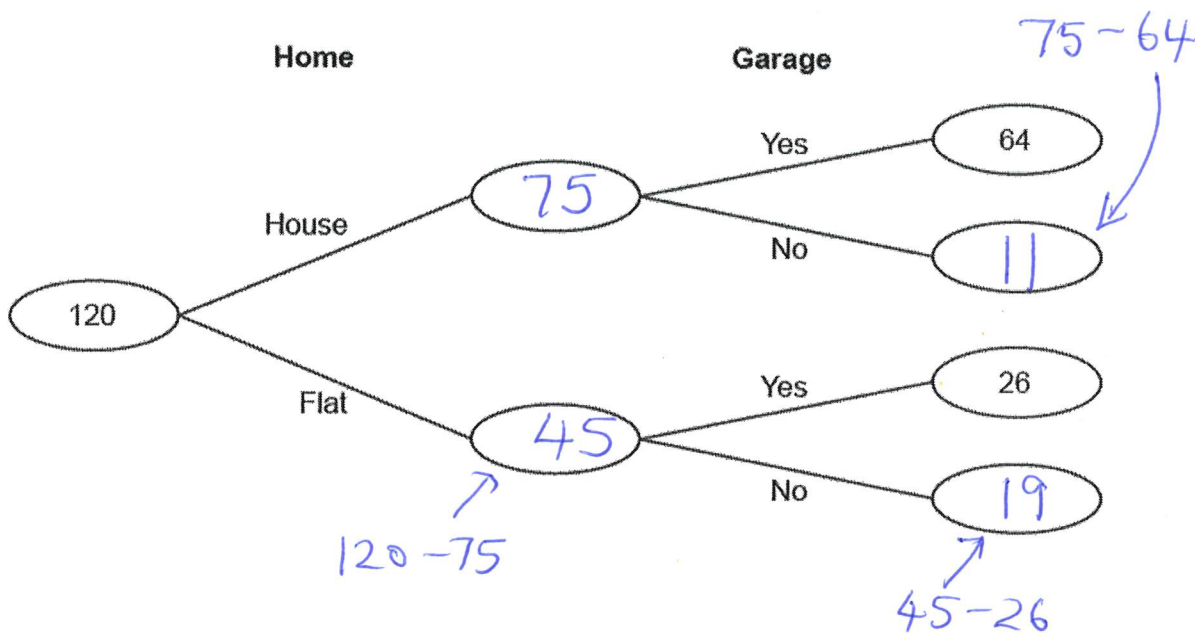
$$\begin{aligned} \text{Ways to buy: } & 2\text{kg} \times 4 + 1\text{kg} \\ & = 6.15 \times 4 + 3.20 \\ & = \pounds 27.80 \end{aligned}$$

£ 27.80 [4]

$$\begin{aligned} \text{OR: } & 1\text{kg} \times 9 \\ & 3.20 \times 9 = \pounds 28.80 \end{aligned}$$

- 23 120 new homes are built in a village.
 Each home is either a house or a flat.
 Each home either has a garage or does not have a garage.
 64 of the houses have a garage and 26 of the flats have a garage.

This frequency tree shows the above information.



- (a) $\frac{5}{8}$ of the homes are houses.

Complete the frequency tree.

$$\frac{5}{8} \times 120 = 75$$

[4]

(use calculator!)

- (b) Show that 75% of the homes have a garage.

eg. $64 + 26 = 90$

$$\frac{90}{120} \times 100 = \underline{\underline{75\%}}$$

[2]

24 A circle has radius 6 cm.

Calculate its circumference.

Give your answer in centimetres, correct to 1 decimal place.

(on formula sheet) $C = 2\pi r = 2 \times \pi \times 6$
 $= 37.69911184$

..... 37.7 cm [3]

25 Dinosaurs first appeared on Earth 2.4×10^8 years ago.
Dinosaurs became extinct on Earth 7×10^7 years ago.

(a) Explain why it is appropriate to use standard form for these numbers.

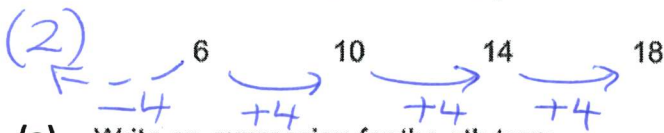
..... They're very large.
.....
..... [1]

(b) Use the given information to work out how long dinosaurs existed on Earth.
Give your answer in standard form.

(use calculator!) $(2.4 \times 10^8) - (7 \times 10^7)$
 $= 1.7 \times 10^8$

(b) [3]

26 Here are the first four terms of a sequence.



(a) Write an expression for the n th term.

(a) $4n + 2$ [2]

(b) Explain why 511 is not a term in the sequence.

eg. All the terms are even, but 511 is odd. [1]

27 Aditi, Becky and Calli collect coins.
Aditi has 6 more coins than Becky.
Calli has 1 less coin than Aditi.
Altogether they have 71 coins.

Becky = x
Aditi = $x + 6$
Calli = $x + 6 - 1 = x + 5$

How many coins do they each have?
Show all your working.

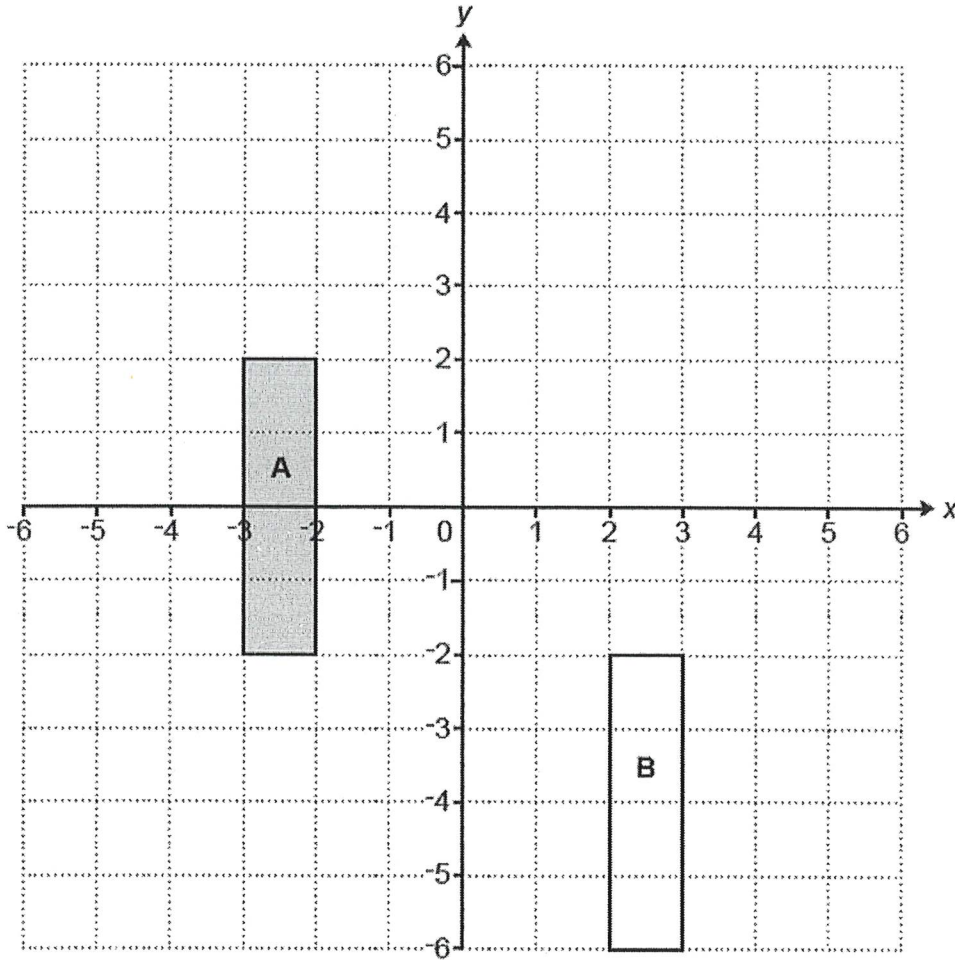
$$\begin{aligned} x + x + 6 + x + 5 &= 71 \\ 3x + 11 &\stackrel{|}{=} 71 \\ -11 \quad | \quad -11 & \\ \hline 3x &\stackrel{|}{=} 60 \\ \div 3 \quad | \quad \div 3 & \\ x &= 20 \end{aligned}$$

check: $26 + 20 + 25 = 71 \checkmark$

Aditi has 26 coins
Becky has 20 coins
Calli has 25 coins [5]

Handwritten annotations: $20 + 6$ with an arrow pointing to 26; $26 - 1$ with an arrow pointing to 25.

28 Rectangle A and rectangle B are drawn on the coordinate grid.

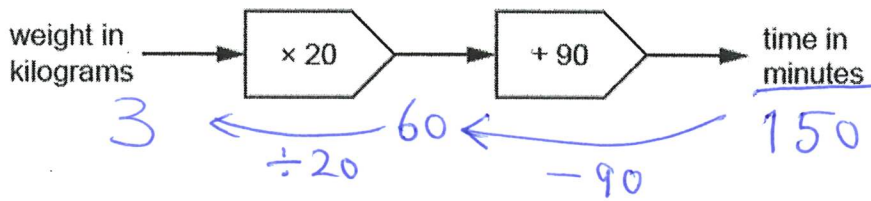


Describe fully two different single transformations that map rectangle A onto rectangle B.

1 translation by $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$

2 rotation 180° about $(0, -2)$

29 Here is a rule to work out the time, in minutes, needed to cook a turkey.



(a) Ling's turkey takes 150 minutes to cook.

Use the rule to work out the weight of Ling's turkey.

(a) 3 kg [2]

(b) James cooks a different turkey.

His turkey weighs 6 kg.

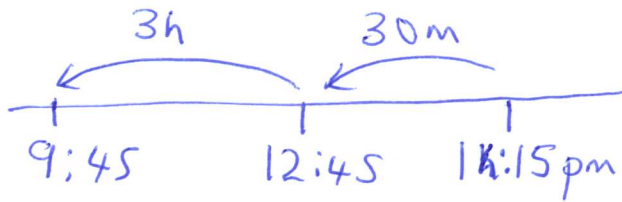
James wants to take his turkey out of the oven at 1:15 pm.

Use the rule to work out at what time James should put his turkey in the oven.

You must show your working.

$$6 \times 20 + 90 = 210 \text{ mins}$$

$$= 3 \text{ h } 30 \text{ mins}$$



(b) 9:45 am [5]

30 For each statement, complete the box to show the power of 10.

(a) One million = $10^{\boxed{6}}$ 1 000 000 [1]

(b) One thousandth = $10^{\boxed{-3}}$ $\frac{1}{1000} = \frac{1}{10^3} = 10^{-3}$ [1]

- 31 In July the price of a holiday is £500.
 In August the price increases by 25%.
 In September the price drops to £500 again.

Work out the percentage decrease from the August price to the September price.

$$\text{Aug: } 500 \times 1.25 = \pounds 625$$

$$\% = \frac{\text{difference}}{\text{original}} \times 100$$

$$= \frac{625 - 500}{625} \times 100$$

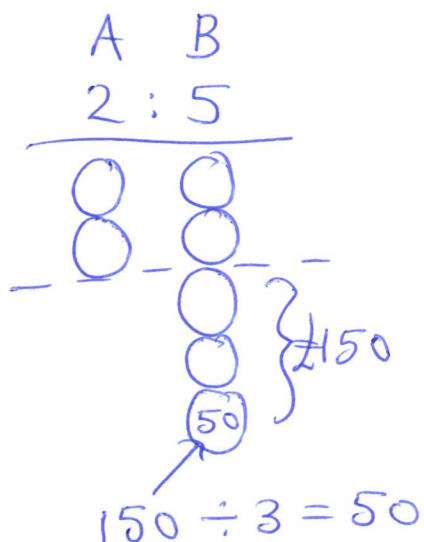
$$= 20$$

20

..... % [4]

- 32 Alex and Blake share some money in the ratio 2 : 5.
 Blake receives £150 more than Alex.

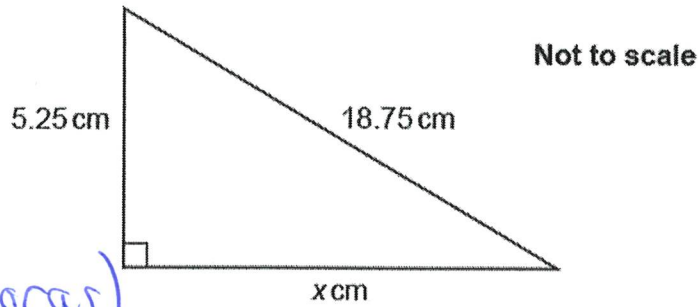
How much money does Alex receive?



$$\text{Alex: } 50 \times 2$$

$$\pounds = \pounds 100 \quad [3]$$

33 Here is a right-angled triangle.



(Pythagoras)

Work out the value of x.

$$\sqrt{18.75^2 - 5.25^2}$$
$$= 18$$

x = 18 [3]

34 Ping chooses four numbers.

The mode of these four numbers is 8, the range is 7 and the mean is 11.

Find Ping's four numbers.

Try to make one work
eg. 8, 8, 8, 8

total =
 $11 \times 4 = 44$

mode = 8

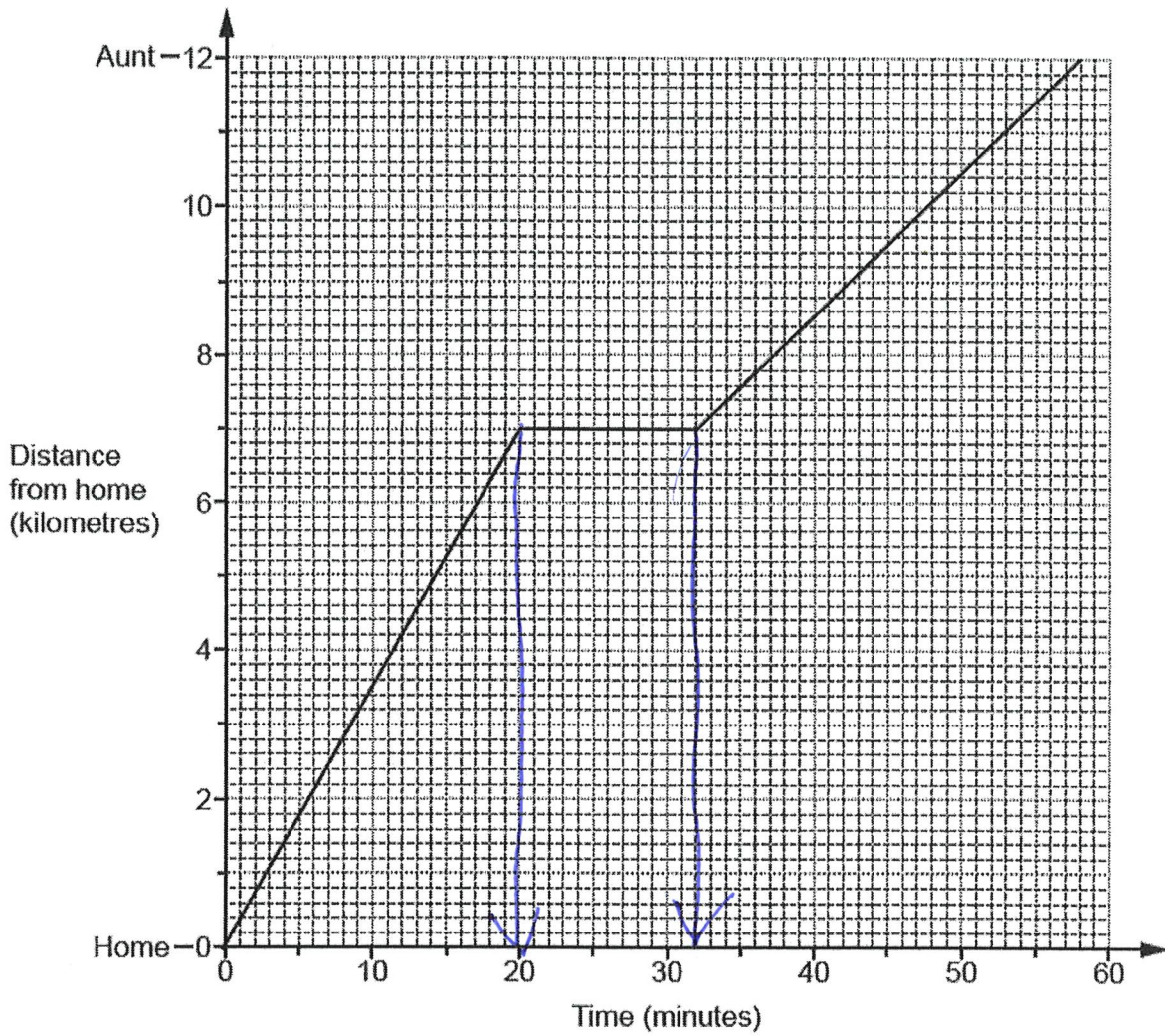
makes total 44

8 8 13 15

range = 7

..... [3]

- 35 Viraj cycled from his home to visit his aunt. He drew this graph to show his journey. He stopped at a shop 7 km from his home.



- (a) State one assumption that Viraj made when he drew his graph.

Viraj cycled at a constant speed
(due to straight lines) [1]

- (b) For how long did Viraj stop at the shop?

$$32 - 20 =$$

(b) 12 minutes [1]

- (c) Work out Viraj's average speed between his home and the shop.
Give your answer in metres per minute.

$$\text{Speed} = \frac{\text{dist}}{\text{time}} = \frac{6.5 \text{ km}}{20 \text{ min}} = 0.325 \text{ km/min}$$

↓ × 1000

(c) 325 metres per minute [3]

- (d) How can you tell, without doing any calculations, that Viraj's average speed between his home and the shop is greater than his average speed between the shop and his aunt?

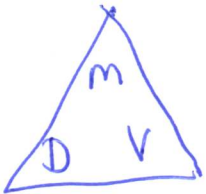
..... The line is steeper between
..... home and the shop. [1]

- 36 Write 6050000 in standard form.

(a) 6.05×10^6 [1]

- 37 The mass of a stone is 680 g.
The density of the stone is 1.6 g/cm^3 .

- (a) Work out the volume of the stone.



$$V = \frac{m}{D} = 680 \div 1.6 =$$

(a) 425 cm^3 [2]

- (b) Write 1.6 g/cm^3 in kg/m^3 .

$$1.6 \text{ g/cm}^3$$

↓ ÷ 1000

$$0.0016 \text{ kg/cm}^3$$

↓ × 1000

$$1600 \text{ kg/m}^3$$

(b) 1600 kg/m^3 [1]

40 Solve the simultaneous equations.

$$3x + y = 11$$

$$x + y = 3$$

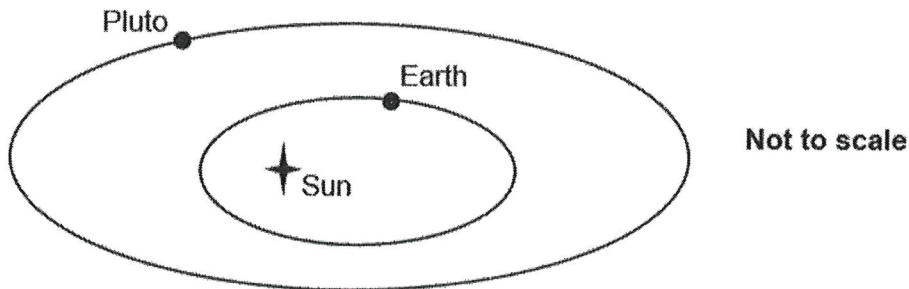
Subtract,

$$\begin{array}{r} 2x = 8 \\ \div 2 \qquad \qquad \div 2 \\ \hline x = 4 \end{array}$$

$$\begin{array}{r} x + y = 3 \\ 4 + y = 3 \\ -4 \qquad \qquad -4 \\ \hline y = -1 \end{array}$$

$$\begin{array}{l} x = \dots\dots\dots 4 \dots\dots\dots \\ y = \dots\dots\dots -1 \dots\dots\dots \end{array} \quad [3]$$

41 Earth and Pluto go around the Sun. Their distance to the Sun varies.



The table shows the closest distance that Earth and Pluto get to the Sun.

	Closest distance to the Sun (km)
Earth	1.47×10^8
Pluto	4.44×10^9

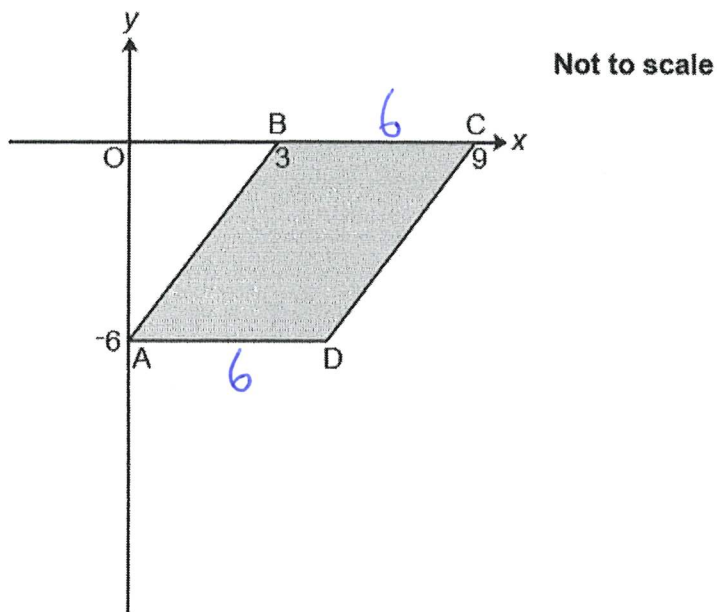
42 Show that the closest distance of Pluto to the Sun is roughly 30 times the closest distance of Earth to the Sun. [2]

$$(1.47 \times 10^8) \times 30 = 4.41 \times 10^9$$

↑
(use calculator!)

is roughly equal to
 4.44×10^9

42 The graph shows a parallelogram ABCD.



A has coordinates (0, -6), B has coordinates (3, 0) and C has coordinates (9, 0).

Find the equation of the line that passes through the points C and D, giving your answer in the form $y = mx + c$.

You must show your working.

$$D = (6, -6)$$

$$C = (9, 0)$$

$$\text{gradient} = \frac{-6-0}{6-9} = \frac{-6}{-3} = \frac{6}{3} = 2$$

$$\downarrow$$
$$y = 2x + c$$

$$\text{At C, } x=9 \text{ \& } y=0$$

$$0 = 2 \times 9 + c$$

$$0 = 18 + c$$

$$c = -18$$

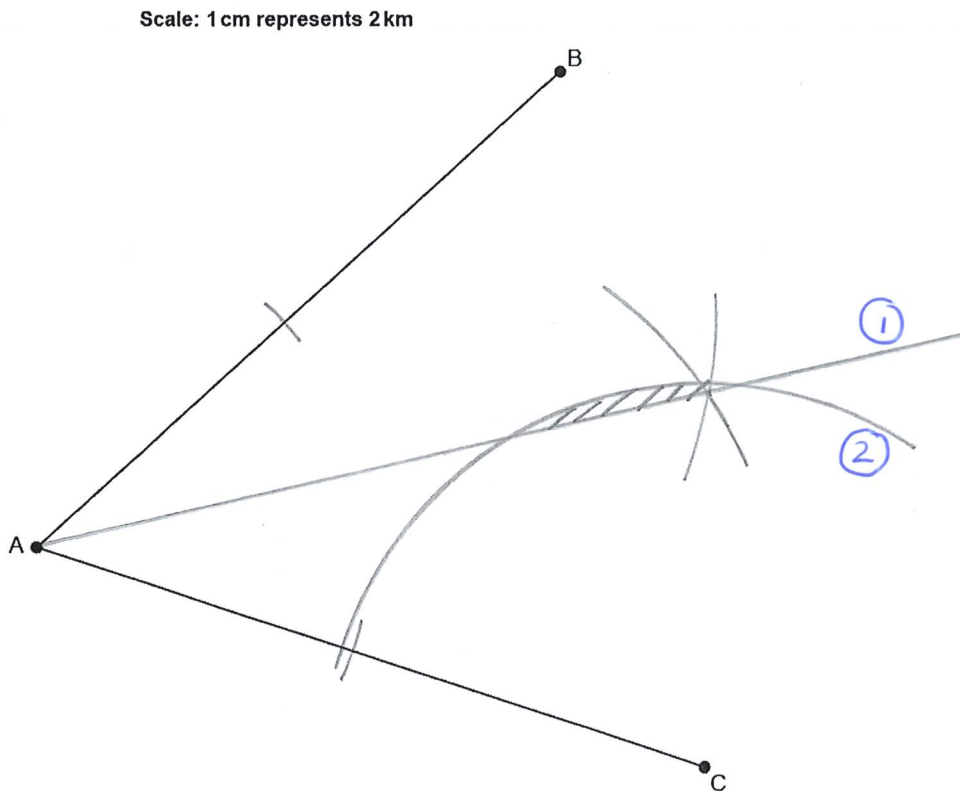
$$\underline{y = 2x - 18} \quad [5]$$

43 The scale diagram below shows towns, A, B and C.
 Line AB represents the road from A to B and line AC represents the road from A to C.

A shopping centre is to be built so that it is

- nearer to the road from A to B than the road from A to C,
- less than 14 km from town C.

(a) Using construction, shade the region where the shopping centre could be built.
 Show all your construction lines.



(b) Explain why the region found in part (a) may not be an appropriate site for the shopping centre.

eg. • no road access, perhaps
 • may be a lake/hill/marsh (etc.) there. [1]

44 (a) Complete this table for $y = x^2 - 5$.

x	-4	-3	-2	-1	0	1	2	3
y	11	4	-1	-4	-5	-4	-1	4

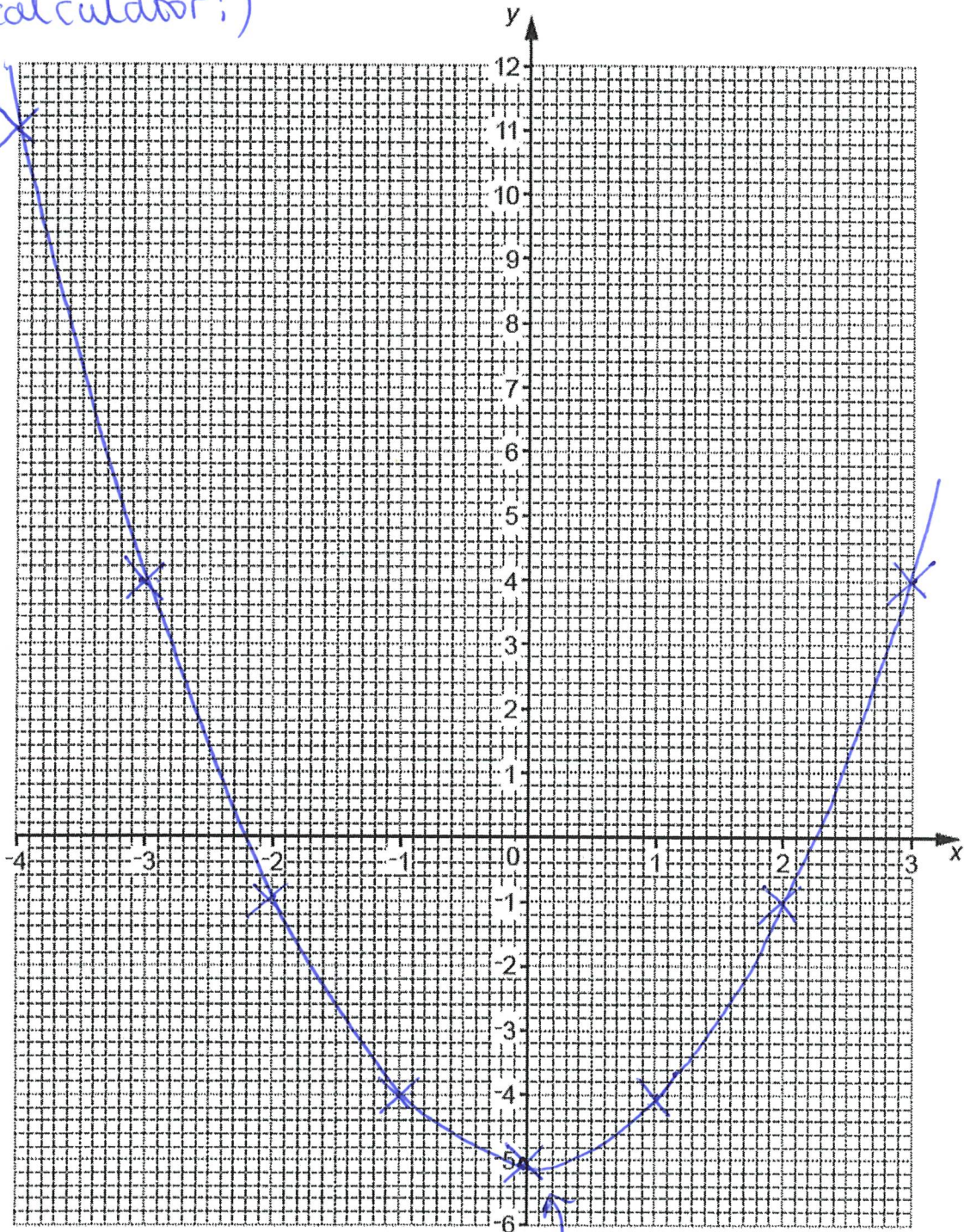
$(-4)^2 - 5$ →

← $0^2 - 5$

[2]

(b) Draw the graph of $y = x^2 - 5$ for the values of x from -4 to 3.

(use calculator!)



[3]



"u" shape
not a point

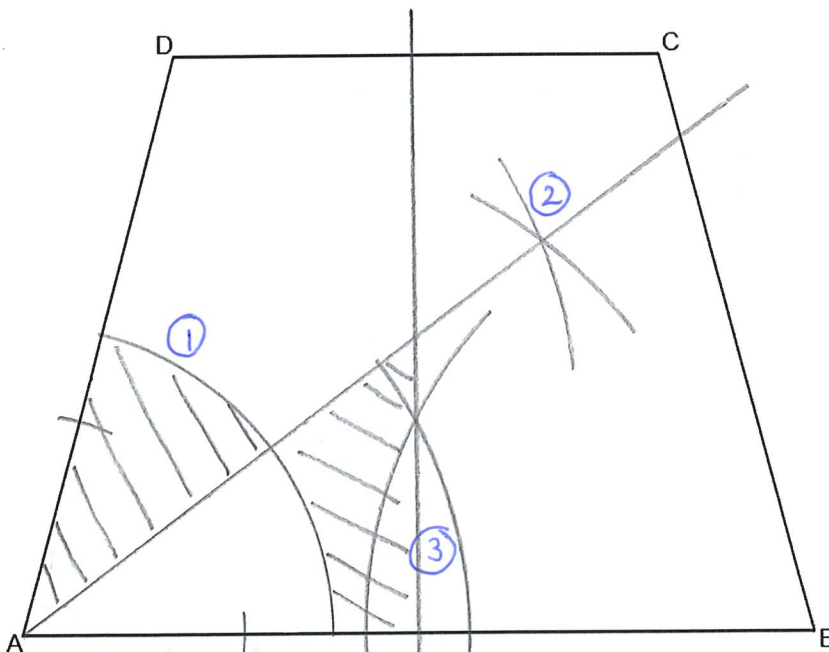
- (c) Use the graph to solve the equation $x^2 - 5 = 0$.
Give your answers to 1 decimal place.

Approx. answers —
where your graph
crosses the x -axis

(c) $x = -2.2$ or $x = 2.25$ [2]

- 45 The diagram shows the scale drawing of a sandpit, ABCD.
It also shows the arc of all points in the sandpit that are 80 cm from corner A.

Scale: 1 cm represents 20 cm



A game is played by throwing a ball into the sandpit.
Points may be scored when the ball lands in the sandpit.

- 1 point if the ball lands within 80 cm of corner A, ① (circle centre A)
and
- 1 point if the ball is closer to side AB than side AD, ② (bisect angle)
and
- 1 point if the ball is closer to corner A than corner B, ③ (bisect side AB)

By completing the construction, find and shade the regions where 2 points can be scored.
Show all your construction lines.

[6]

46

Solve by factorising.

$$\begin{array}{r} x^2 + 4x - 12 = 0 \\ + \quad \times \end{array}$$

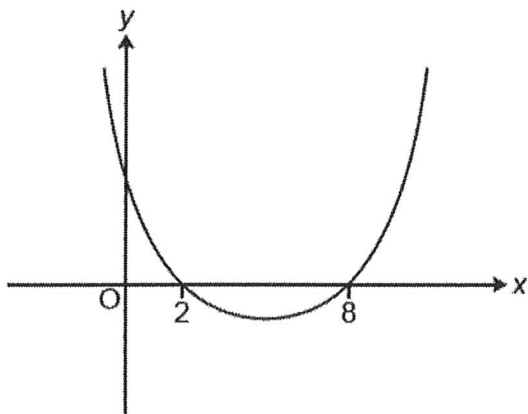
multiply to make -12

- 12, 1
- 12, -1
- 6, 2
- 6, -2** ← add to 4
- 4, 3
- 4, -3

$$(x + 6)(x - 2) = 0$$

\uparrow \uparrow
 $x = -6$ or $x = 2$ [3]

47 This is a sketch of the graph of $y = x^2 - 10x + 16$.



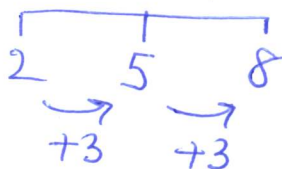
Not to scale

(a) Write down the value of the y-intercept.

(a) 16 [1]

(b) Write down the x-coordinate of the turning point.

(b) 5 [1]



- 48 Four friends are going on holiday together.
They each take a suitcase.
The weight of each suitcase is 25 kg, correct to nearest kilogram.

Complete the error interval for the weight, w kg, of one suitcase.

$$\underline{\dots\dots\dots} \leq w < \underline{\dots\dots\dots} \quad [2]$$

25.5 *26.5*

- 49 A machine can dig, on average, 2 cm of tunnel each minute.
It operates 24 hours each day.

- (a) Work out how many days it should take to dig a tunnel of length 3.5 km.
Give your answer to the nearest day.

$$\begin{aligned} & 2 \text{ cm / min} \\ \times 60 \downarrow & \\ & 120 \text{ cm / hour} \\ \times 24 \downarrow & \\ & 2880 \text{ cm / day} \\ \div 100 \downarrow & \\ & \underline{28.8 \text{ m / day}} \end{aligned}$$

$$\begin{array}{r} \overline{\hspace{1cm}} \\ \downarrow \times 1000 \\ 3500 \text{ m} \end{array}$$

$$3500 \div 28.8 = 121.527\bar{7}$$

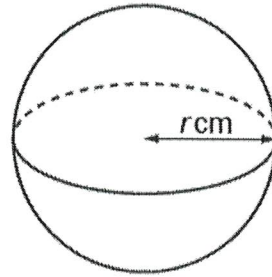
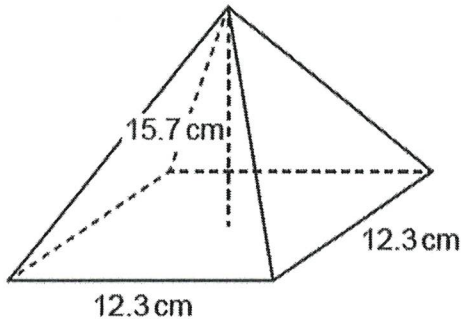
(a) 122 days [4]

- (b) The machine actually digs an average of 2.5 cm of tunnel each minute for most of the time and an average of 1.5 cm each minute for the rest of the time.

How would this affect your answer to part (a)?

.....
It would be smaller
.....
(Digging faster overall, so
..... [1]
fewer days needed)

50 The diagram shows a square-based pyramid and a sphere.



The pyramid has base length 12.3 cm and perpendicular height 15.7 cm.
The sphere has radius r cm.

The pyramid and the sphere have the same volume.

Work out the radius of the sphere.
You must show your working.

[The volume of a pyramid is $\frac{1}{3} \times$ area of base \times perpendicular height. \leftarrow (use these)
The volume V of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

$$\begin{aligned} \text{Vol pyramid} &= \frac{1}{3} \times (12.3 \times 12.3) \times 15.7 \\ &= 791.751 \end{aligned}$$

sphere,

$$\begin{aligned} \frac{4}{3} \times \pi \times r^3 &= 791.751 \\ \div \frac{4}{3} \quad \downarrow \quad \div \frac{4}{3} \quad \downarrow \quad \div \frac{4}{3} \\ \pi \times r^3 &= 593.81325 \\ \div \pi \quad \downarrow \quad \div \pi \quad \downarrow \quad \div \pi \\ r^3 &= 189.016628 \\ \sqrt[3]{\quad} \quad \downarrow \quad \sqrt[3]{\quad} \quad \downarrow \quad \sqrt[3]{\quad} \\ r &= \underline{\underline{5.738961841}} \end{aligned}$$

..... cm [5]