OCR
Oxford Cambridge and RSA

Friday 10 November 2023 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You must have:
- the Formulae Sheet for Foundation Tier (inside this document)

You can use:
- geometrical instruments
- tracing paper

Do not use:
- a calculator

F

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. You can use extra paper if you need to, but you must clearly show your candidate number, the centre number and the question numbers.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **20** pages.

ADVICE
- Read each question carefully before you start your answer.

1 Work out.

(a) 45×100

4500

(a) 4500 **[1]**

(b) $37 \div 100$

0.37

(b) 0.37 **[1]**

(c) $2.36 + 1.79$

$$\begin{array}{r} {}^{1}2.{}^{1}36 \\ +\ 1.79 \\ \hline 4.15 \end{array}$$

(c) 4.15 **[1]**

(d) $0.82 - 0.36$

$$\begin{array}{r} 0.{}^{7}8{}^{1}2 \\ -\ 0.36 \\ \hline 0.46 \end{array}$$

(d) 0.46 **[1]**

2 **(a)** **(i)** Write down 50% of 80.

(a)(i) 40 **[1]**

(ii) Use your answer to part **(a)(i)** to complete this statement.

50% of 80 is the same as 25 % of 160 **[1]**

(b) Write 36 as a fraction of 120.
Give your answer in its simplest form.

$\frac{36}{120} \div 12 \quad \frac{3}{10}$

(b) $\frac{3}{10}$ **[2]**

3 **(a)** Work out.

$\frac{2}{3}+\frac{2}{3}$

Give your answer as a mixed number.

$\frac{4}{3} = 1\frac{1}{3}$

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

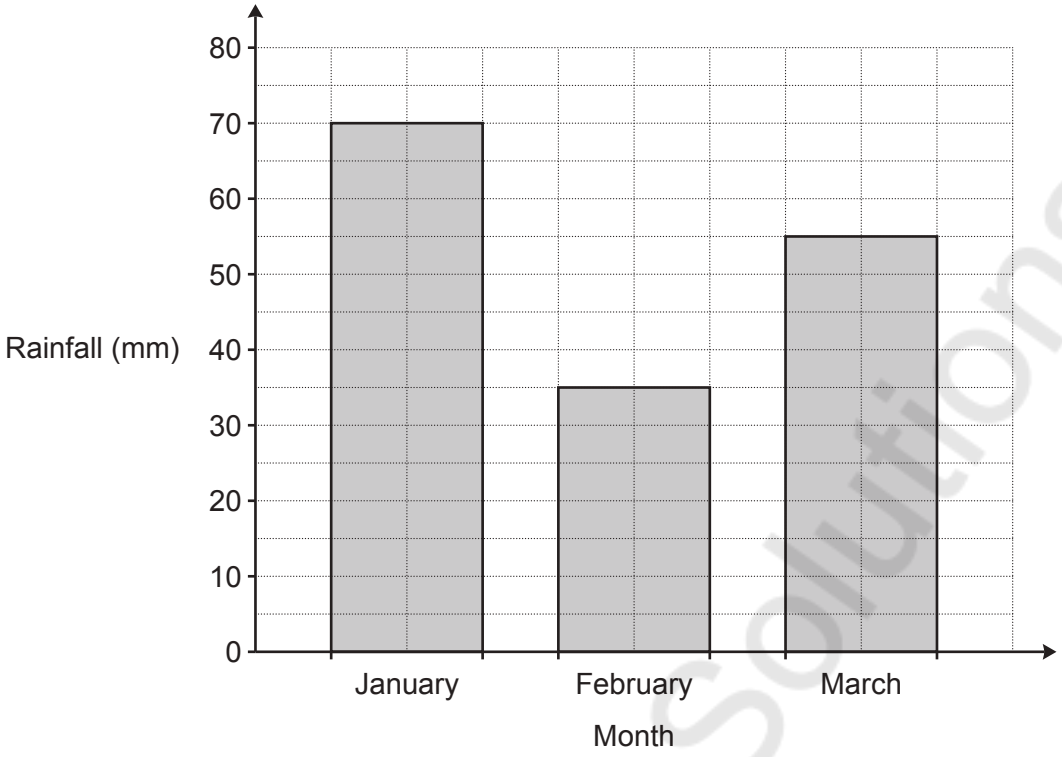
(b) Work out.

$\frac{1}{4} \div \frac{1}{8}$

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

(b) 2 **[2]**

4 The bar chart shows the rainfall, in millimetres (mm), for a city in the first three months of the year.



(a) Write down the amount of rainfall in February.

(a) ..... 35 ..... mm **[1]**

(b) Write in its simplest form the ratio
amount of rainfall in February : amount of rainfall in March.

35 : 55
÷5 ÷5
7 : 11

(b) ..... 7 ..... : ..... 11 ..... **[2]**

(c) The total amount of rainfall in January and February was the same as the total amount of rainfall in March and April.

Work out the amount of rainfall in April.

Jan & Feb = 70mm + 35mm
= 105mm

March & April = 55mm + x = 105mm

x = 105 − 55 = 50mm **(c)** ..... 50 ..... mm **[3]**

5 Complete the three missing values on this multiplication grid.

×	-5	9
-4	20	**-36**
-6	**30**	-54

[3]

6 Three adults, Amos, Beth and Charlie, are comparing their age in years.

Amos is 32.
Beth is 48.
The mean age of Amos, Beth and Charlie is 50.

Work out the age of Charlie.

$\text{Mean} = \frac{\text{total}}{\text{no. of values}}$

$50 = \frac{32 + 48 + x}{3}$

$50 = \frac{80 + x}{3}$

$\times 3 \qquad \times 3$

$150 = 80 + x \qquad x = 70$

$-80 \quad -80$

70 ..... **[3]**

7 Which is smaller, 65% or $\frac{16}{25}$?

Show your working and give a reason for your answer.

65 %. $\frac{16}{25} \xrightarrow{\times 4} \frac{64}{100} = 64\%$.

$\frac{16}{25}$ ..... is smaller because ..... 64% is less than 65% .....

..... **[3]**

8 Complete each statement.

(a) 24.2 ÷ 0.5 = 48.4 **[1]**

24.2
+ 24.2
48.4

(b) 3.02 × 4 = 12.08 **[2]**

3.02
4 | 12.08

9 **(a)** Four apples cost £1.80.

Find the cost of five of these apples.

÷4 (4 apples = £1.80) ÷4
(1 apple = £0.45)
×5 (5 apples = £2.25) ×5

0.45
4 | 1.¹8²0

²45
× 5
225 ÷100 → 2.25

(a) £ 2.25 **[2]**

(b) By rounding each value to **one** significant figure, estimate the cost of 8.2 kg of bananas at 73p per kg.
Give your answer in pounds.

8.2 kg ≈ 8 kg

73p ≈ 70p

8 kg × 70p = 560p
÷100 ↓
£5.60

(b) £ 5.60 **[3]**

10 Choose a word from this list which best describes each statement.

Equation Expression Formula Inequality Term

(a) $2b + 2w$ **(a)** Expression **[1]**

(b) $\pi r^2 = 30$ **(b)** Equation **[1]**

11 A bag contains only red, green and blue counters.

- 8 of the counters are red.
- 15 of the counters are green.
- The rest of the counters are blue.

Sam chooses one counter at random from the bag.

The probability that this is a green counter is $\frac{3}{8}$.

Work out the number of blue counters in the bag.

p(green) = $\frac{3}{8}$

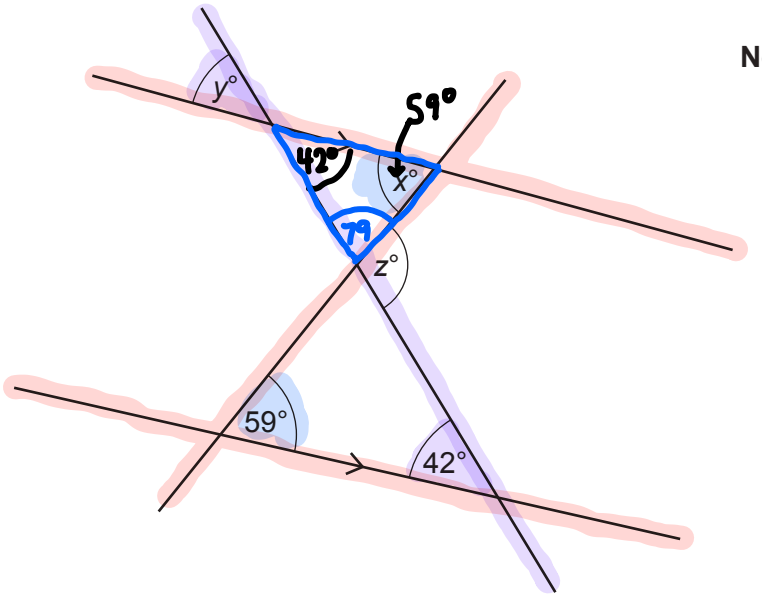
$\frac{3}{8} \overset{\times 5}{=} \frac{15}{x}$ $x = 40$

8 + 15 = 23

40 − 23 = 17

17 **[4]**

12 The diagram shows two straight lines crossing a pair of parallel lines.



Not to scale

(a) (i) Find the value of x.
Give a geometrical reason for your answer.

x = 59 because alternate angles are equal.

..... **[2]**

(ii) Find the value of y.
Give a geometrical reason for your answer.

y = 42 because corresponding angles are equal.

..... **[2]**

(b) Find the value of z.

$180° - (59 + 42)$

$= 180 - 101$

$= 79°$

$z = 180° - 79°$

$= 101°$

(b) z = 101 **[2]**

13 **(a)** Work out.

3^4

$3 \times 3 \times 3 \times 3$

$9 \times 9 = 81$

(a) 81 **[2]**

(b) Simplify.

$\frac{5x^2}{x}$

$5x^2 \div 1x^1$

$5x^1$

(b) $5x$ **[1]**

(c) Rearrange this formula to make x the subject.

$y = \frac{x}{5} + 2$

$-2 \quad -2$

$y - 2 = \frac{x}{5}$

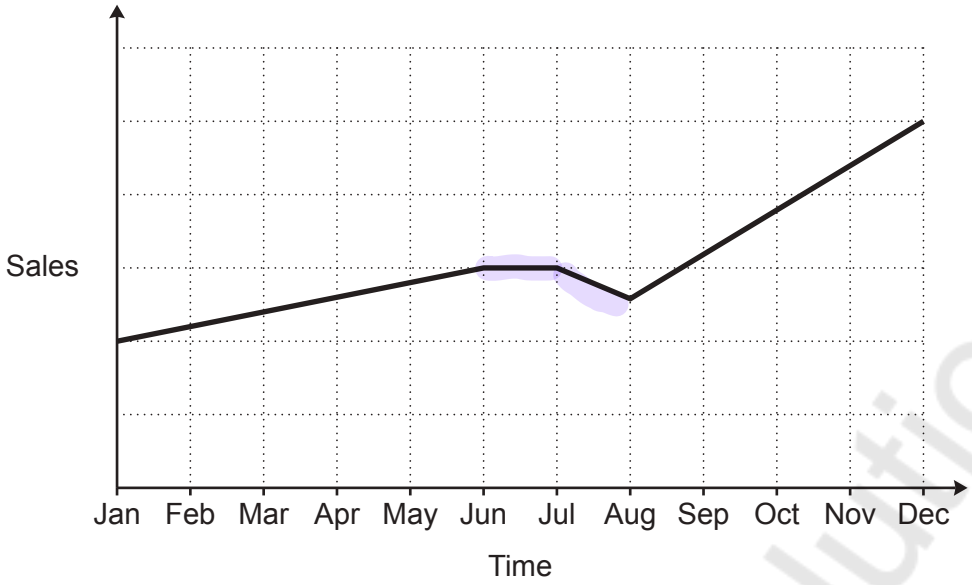
$\times 5 \qquad \times 5$

$5(y - 2) = x$

$5y - 10 = x$

(c) $x = 5y - 10$ **[2]**

14 A sales representative and a manager discuss this graph of sales over the last year.



(a) The sales representative says

I can tell from the graph that, over the last year, sales have risen every month.

Is the sales representative correct?
Give a reason for your answer.

No because the graph dips in July.

[1]

(b) The manager says

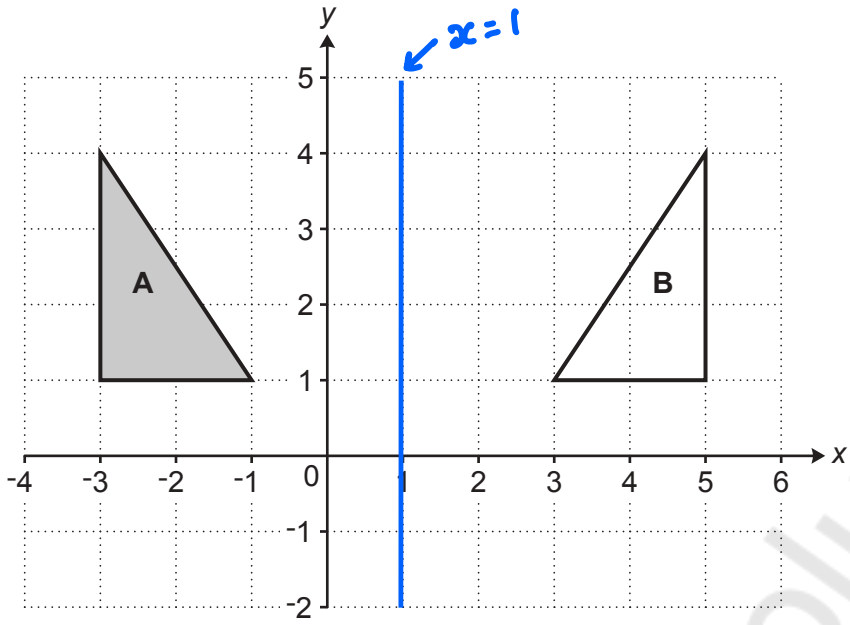
I can tell from the graph that sales are now more than double what they were at the start of the year.

Is the manager correct?
Give a reason for your answer.

No because no scale on the vertical axis

[1]

15 Triangle **A** and triangle **B** are drawn on the coordinate grid.



Describe fully the **single** transformation that maps triangle **A** onto triangle **B**.

Reflection in the line $x = 1$

..... **[2]**

16 **(a)** Here are the first five terms of a sequence.

4 (+4) 8 (+4) 12 16 20 (+4) 24

(i) Write down the next term of the sequence.

(a)(i) 24 **[1]**

(ii) Kai says

All of the terms in the sequence are even numbers.
402 is an even number.
Therefore, if the sequence is continued, 402 will be in the sequence.

Is Kai correct?
Give a reason for your decision.

No because 402 is not a multiple of 4

[1]

(b) Here are the first five terms of another sequence.

0.25 (×2) 0.5 (×2) 1 2 4 (×2) 8

(i) Write down the next term of the sequence.

(b)(i) 8 **[1]**

(ii) Explain how you worked out your answer.

Multiplied 4 by 2

[1]

17 A motorist wants to buy a new car but does not have enough money.

The price of the car is £16 000.

The motorist sees this notice for a deal on the car they want to buy.
The number of equal monthly payments is hidden.

> Pay 15% of the price of the car now
> and then
> equal monthly payments of £300

Work out the number of monthly payments if the total cost of the car to the motorist is £17 400.
You must show your working.

15% of £16,000

10% = £1600

5% = £800

15% = £2400

£17400
- £2400
£15000

$\frac{15000}{300} = 50$

.....50..... **[4]**

18 A box contains only red, green and black pens.
The ratio of red pens to green pens to black pens is 1 : 4 : 11.

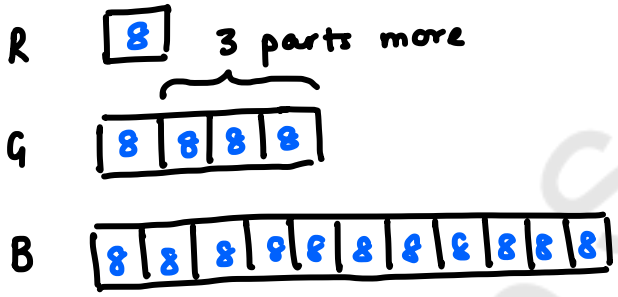
(a) Work out the percentage of the pens that are green.

$\frac{4}{16} \overset{\div 4}{\underset{\div 4}{=}} \frac{1}{4} \overset{\times 25}{\underset{\times 25}{=}} \frac{25}{100} = 25\%$

(a) ..... 25 ..... % **[2]**

(b) There are 24 more green pens than red pens.

Work out the total number of pens in the box.



$24 \div 3 = 8$

Red = 8 Green = 32 Black = 88

Total = 8 + 32 + 88
= 128

(b) ..... 128 ..... **[4]**

19 A solid wooden block has a volume of 900 cm^3.
The density of the wood is 0.7 g/cm^3.

Calculate the mass of the wooden block.
Give the units of your answer.

D V m

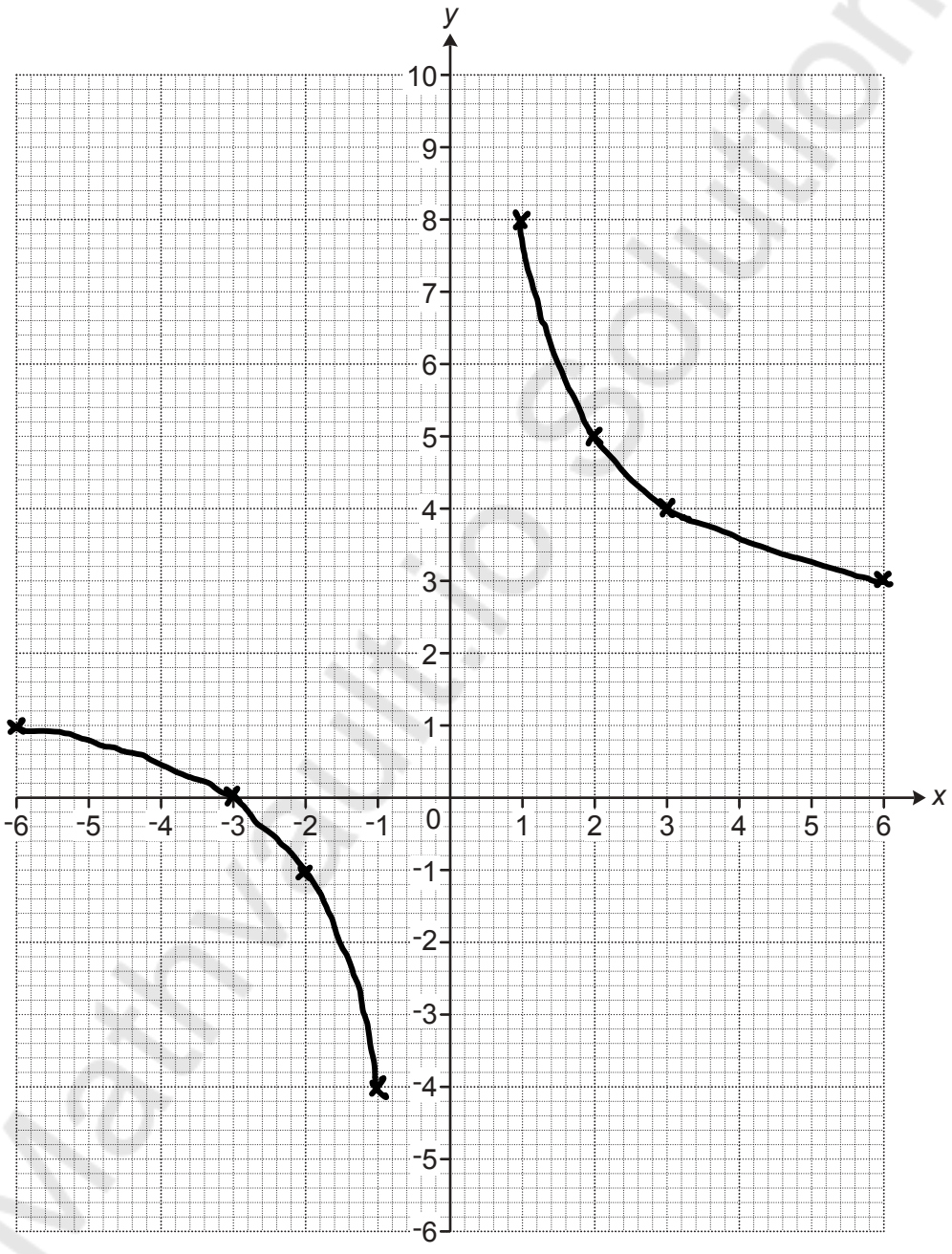
$V = 900\ cm^3$
$D = 0.7\ g/cm^3$
$m = D \times V$
$= 0.7 \times 900$
$\times 10$
7×900
$= 6300$
$\div 10$
630

..... 630 .... g ..... **[3]**

20 Here is a table of values for $y = \frac{6}{x} + 2$.

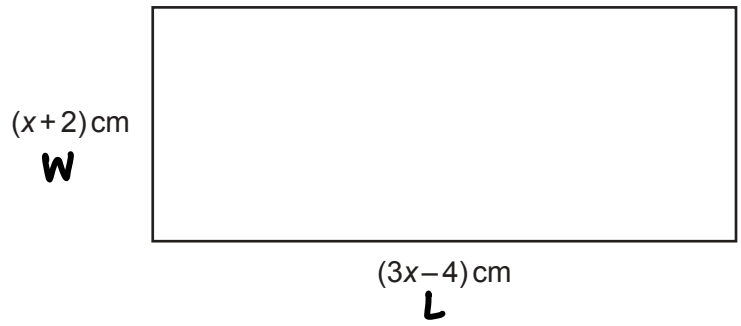
x	-6	-3	-2	-1	1	2	3	6
y	1	0	-1	-4	8	5	4	3

Draw the graph of $y = \frac{6}{x} + 2$ for $-6 \leqslant x \leqslant 6,\ x \neq 0$.



[3]

21 The diagram shows a rectangle with length $(3x-4)$ cm and width $(x+2)$ cm.



Not to scale

The length of the rectangle is twice the width of the rectangle.

Calculate the area of the rectangle.
You must show your working.

$3x - 4 = 2(x + 2)$

$3x - 4 = 2x + 4$

$-2x \quad -2x$

$x - 4 = 4$

$+4 \quad +4$

$x = 8$

$L = 3x - 4$
$= 3(8) - 4$
$= 20$ cm

$W = x + 2$
$= 8 + 2$
$= 10$ cm

$A = l \times w$
$= 20\text{cm} \times 10\text{cm}$
$= 200\ \text{cm}^2$

..... 200 ..... cm^2 **[6]**

22 A teacher is planning a theme day for the 500 pupils at their school.
The teacher asks a sample of 20 pupils from year 8 which theme they would prefer.

The results are shown in the table.

Theme	Number of pupils
Sport	7
Art and design	3
Recipes	2
Music and movies	8

(a) Describe **two** disadvantages of the teacher's sampling method.

1. Small sample

2. Only one year group used for the sample. **[2]**

(b) Using the results from the table, the teacher estimates that 175 pupils in the school would prefer a sport theme.

Here is the teacher's method.

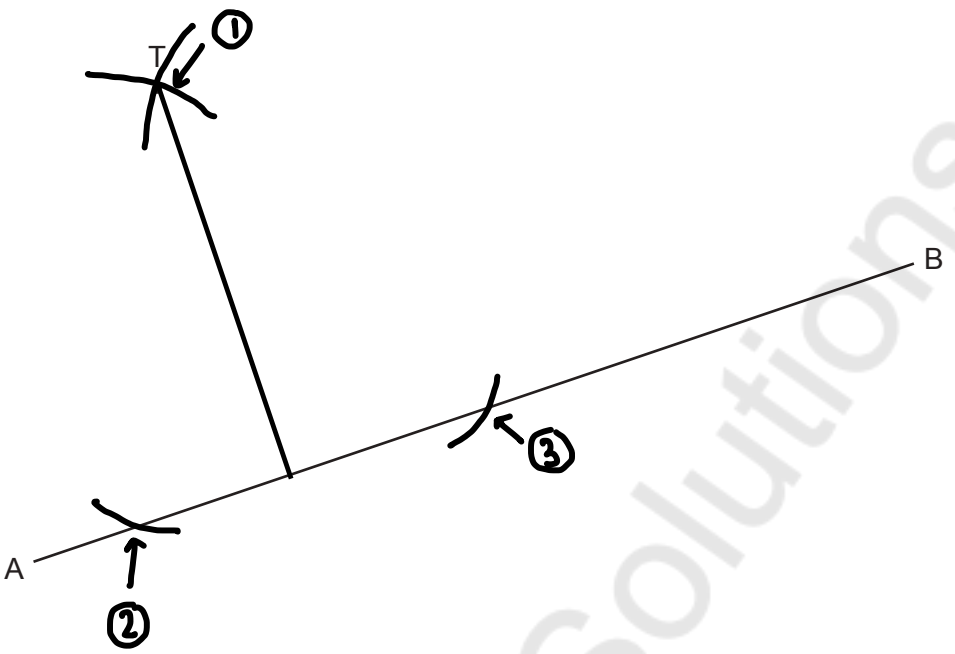
$\frac{7}{20} \times 500 = 175$

Write down **one** assumption the teacher has made when making their estimate.

The sample is representative of the whole school. **[1]**

23 The diagram shows a town T and a straight road AB.

Scale: 2 cm represents 1 km



A new straight road is built from town T to the road AB.
The road is the shortest possible distance from town T to the road AB.

(a) **Using ruler and compasses only**, construct the road from town T to the road AB. **[2]**

(b) The new road costs £200 000 per kilometre to build.
The road constructor says

The new road will cost over £600 000 to build.

Show that the road constructor is incorrect.

5.4 cm ×2.7 (2 cm = 1 km, 5.4 cm = 2.7 km) ×2.7

2.7 × 200,000 = 540000

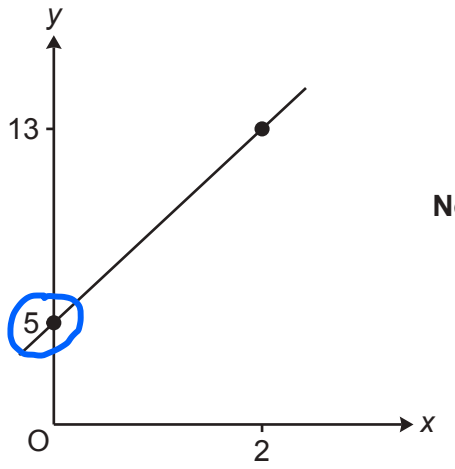
= £540,000

£540,000 < £600,000

..... **[3]**

24 A straight line passes through the points (0, 5) and (2, 13).

$x_1, y_1 \quad x_2 \; y_2$



Not to scale

Find the equation of the line in the form $y = mx + c$.

y-intercept

gradient

$$\text{gradient} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{13 - 5}{2 - 0}$$

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

$$= 4$$

y-intercept = 5

$y = 4x + 5$

.....$y = 4x + 5$..... **[4]**

25 $2^7 \times 2^m = \frac{1}{2}$

Find the value of m.

$$\frac{1}{2} = 2^{-1}$$

$$2^7 \times 2^m = 2^{-1}$$

$$7 + m = -1$$

$$-7 \qquad -7$$

$$m = -8$$

$m =$ .....-8..... **[2]**

Turn over for question 26

26 A triangle has sides of length 6 cm, 10 cm and 12 cm.

a b c

Is this a right-angled triangle?
Show how you decide.

$a^2 + b^2 = c^2$

$6^2 + 10^2 = 12^2$

$36 + 100 = 144$

$136 \neq 144$

No because $136 \neq 144$

..... **[4]**

END OF QUESTION PAPER