OCR
Oxford Cambridge and RSA

Model Solutions

F

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Thursday 2 November 2017 – Morning

Time allowed: 1 hour 30 minutes

6931822683

You may use:
- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper

J560/01

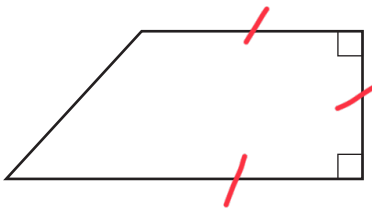
First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **16** pages.

Answer **all** the questions.

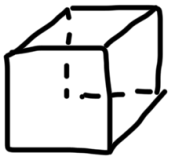
1 **(a)** Write down the mathematical name of this shape.



Pair of parallel sides and a quadrilateral.

(a) Trapezium ..... **[1]**

(b) How many faces does a cube have?



(b) 6 ..... **[1]**

2 **(a)** Write down

(i) a multiple of 13,

$13 \times 2 = 26$

(a)(i) 26 ..... **[1]**

(ii) a prime number between 40 and 50.

43 → only has factors of 1 and 43.

(ii) 43 ..... **[1]**

(b) Find the lowest common multiple (LCM) of 16 and 28.

16 → 16, 32, 48, 64, 80, 96, 112

28 → 28, 56, 84, 112

(b) 112 ..... **[2]**

3 **(a)** Round 7874 to

(i) the nearest hundred,

(a)(i) 7900 **[1]**

(ii) 1 significant figure.

(ii) 8000 **[1]**

(b) Find the value of x.

$3^5 \times 3^2 = 3^x$

$3^5 \times 3^2 = 3^7$

$3^7 = 3^x$

$7 = x$

(b) $x =$ 7 **[1]**

4 **(a)** Use one of these symbols <, > or = to make each statement true.

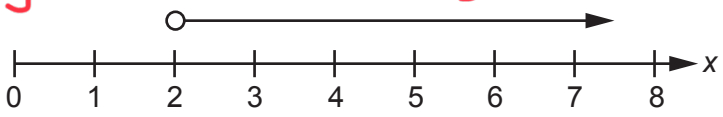
(i) $\frac{1}{4}$ = 0.25 **[1]**

(ii) 0.66 < $\frac{2}{3}$ **[1]**

(iii) 6 < 2^3 **[1]**

(b) Write down the inequality for x that is shown on this number line.

x is larger than 2. Empty circle = not inclusive



(b) $x > 2$ **[1]**

5 Write the following in order of size, smallest first.

28% $\frac{7}{26}$ 2.7

28% = 0.28

$\frac{7}{26}$ = 0.269

2.7

$\frac{7}{26}$ 28% 2.7 **[2]**

smallest

6 **(a)** Simplify.

(i) $2p + 5p - 3p$

$2p + 5p = 7p$

$7p - 3p = 4p$

(a)(i) 4p ..... **[1]**

(ii) $6j + 3k - j - 5k$

$6j - j + 3k - 5k$

$= 5j - 2k$

(ii) $5j - 2k$ ..... **[2]**

(b) Find the value of $10h + 6t$ when $h = 12$ and $t = 4$.

$10(12) + 6(4)$ ← sub in $h = 12$ and $t = 4$

$120 + 24 = 144$

(b) 144 ..... **[2]**

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

$e = f - 7d$

$(-f)\quad e - f = -7d$

$(\div -7)\quad \frac{e-f}{7} = d$

(c) $\frac{-e-f}{7}$ ..... **[2]**

7 Bill owns four cars. Each car is a different colour.
Each day, he drives to work in one of his cars.
The table shows the probability that Bill chooses a car of a particular colour.

Car	red	blue	yellow	white
Probability	0.4	0.17	0.05	0.38

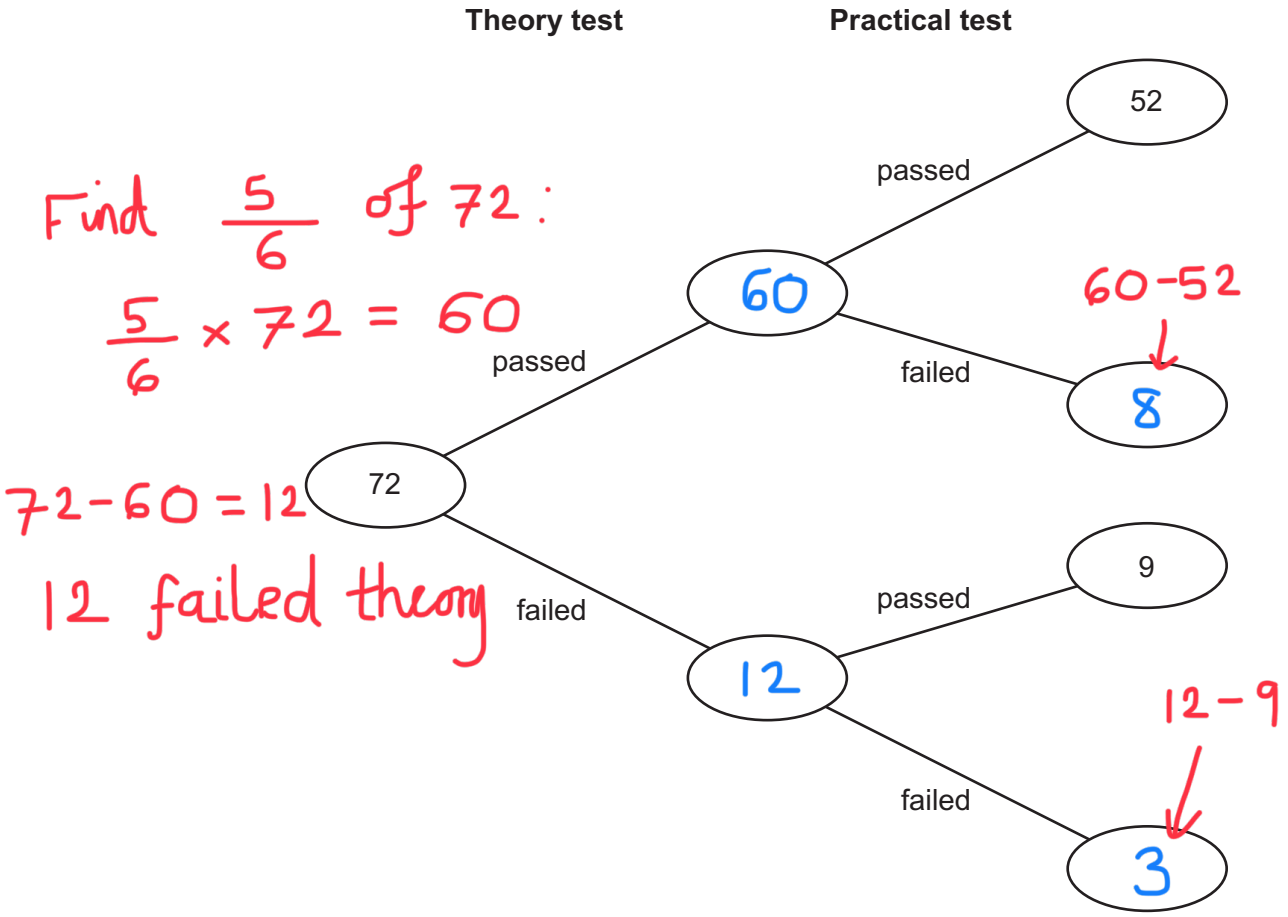
Work out the probability that Bill chooses the white car.

P(white) = 1 − 0.4 − 0.17 − 0.05 = 0.38

0.38 ..... **[2]**

8 72 students each took a theory test followed by a practical test.
They either passed or failed each test.

This frequency tree shows some of the results.



Find $\frac{5}{6}$ of 72:

$\frac{5}{6} \times 72 = 60$

60 − 52

72 − 60 = 12

12 failed theory

(a) How many students passed both tests?

(a) 52 **[1]**

(b) $\frac{5}{6}$ of the 72 students passed the theory test.

Complete the frequency tree. **[4]**

(c) Which test was passed by more students?
Explain your reasoning.

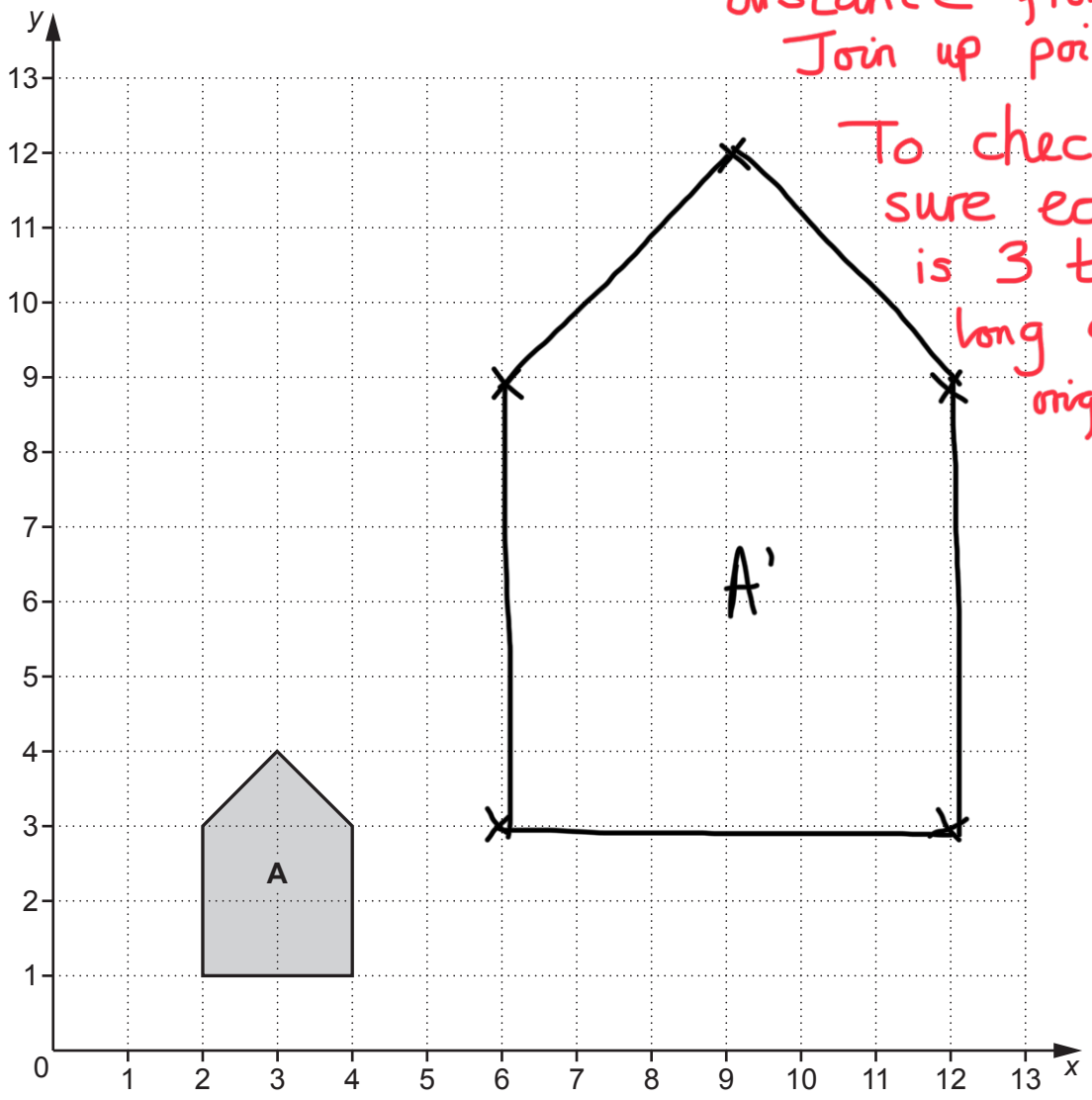
Practical because 52 + 9 = 61

61 passed practical test, but only 60 passed theory. 61 > 60. **[3]**

Draw lines from each vertex, to 3 times the distance from (0,0). Join up points.

To check, make sure each edge is 3 times as long as on the original A.

9 Shape **A** is drawn on the grid below.



Enlarge shape **A** with scale factor 3 and centre of enlargement (0, 0). **[3]**

10 **(a)** Write 62 as a percentage of 500.

$\frac{62}{500} = 0.124 = 12.4\%$

(a) 12.4 % **[3]**

(b) Increase £196 by 9%.

100% = £196

1% = £1.96

109% = £213.64

(b) £ 213.64 **[3]**

11 Students deliver catalogues and leaflets to houses.
One day, they have to deliver 360 catalogues and 1440 leaflets.
Each student can deliver either 15 catalogues **or** 80 leaflets in 1 hour.
Each student can only work for 8 hours.

Work out the **minimum** number of students needed.

360 ÷ 15 = 24 hours

24 ÷ 8 = 3 ← 3 students needed.

1440 ÷ 80 = 18

18 ÷ 8 = 2 remainder 2 → 3 needed

Total students: 3 + 3 = 6

6

..... [4]

12 Leo, Kush and Mai share some money in the ratio 3 : 5 : 8.
Kush receives £750 more than Leo.

Calculate the total amount of money that they shared.

3 : 5 : 8 → 3 + 5 + 8 = 16 parts of ratio

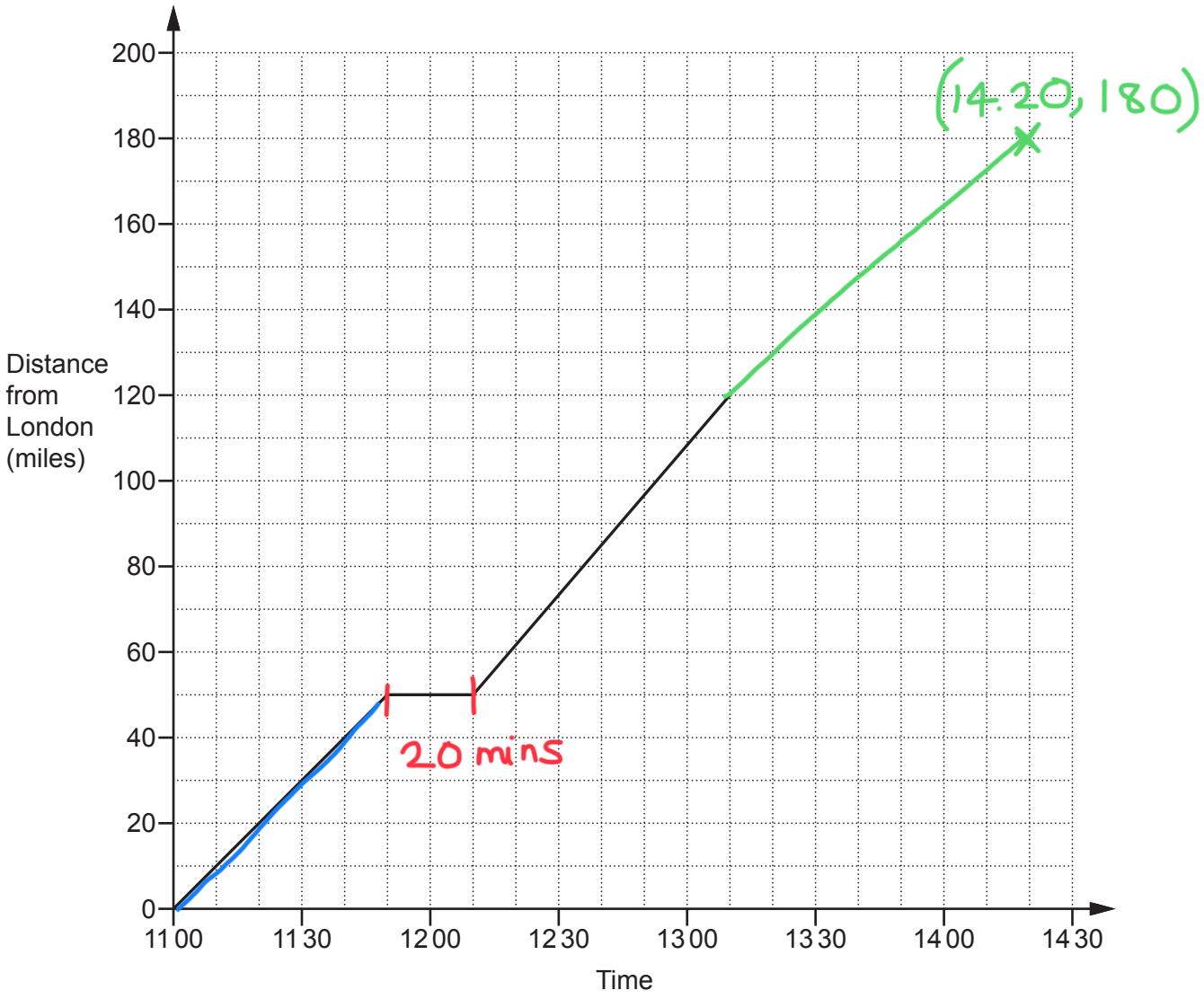
Kush has 2 more parts than Leo.

2 parts = £750

16 parts = £6000

£ 6000 ..... [4]

13 This graph shows part of Lucy's car journey from London to Sheffield.
The car made one stop at a service station.



Use the graph to answer these questions. from 11:50 to 12:10

(a) For how long did the car stop at the service station?

(a) 20 ..... minutes **[1]**

(b) Work out the average speed of the car, in miles per hour, between London and the service station.

$$\text{Speed} = \frac{\text{distance}}{\text{time}} = \text{gradient of graph}$$

$$\text{gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{50 - 0}{5/6} = 60 \text{ mph}$$

(b) 60 ..... mph **[2]**

(c) Sheffield is 180 miles from London.
Lucy arrived in Sheffield at 14 20.

Complete the graph. **[2]**

14 Katy buys *x* cakes.
Gugu buys 3 times as many cakes as Katy.
Deanna buys 2 more cakes than Katy.

Each cake costs 85p.
The total cost of the cakes is £52.70.

How many cakes did each girl buy?

Katy : x (number of cakes Katy buys)

Gugu : $x \times 3 = 3x$

Deanna : $x + 2$

Total cakes : $x + (3x) + (x + 2) = 5x + 2$

price of each cake $\rightarrow 0.85(5x + 2) = 52.70$

$(\div 0.85)$ $5x + 2 = 62$

$x = 12$

$3x = 3 \times 12 = 36$

$x + 2 = 12 + 2 = 14$

Katy: ..... 12 ..... cakes

Gugu: ..... 36 ..... cakes

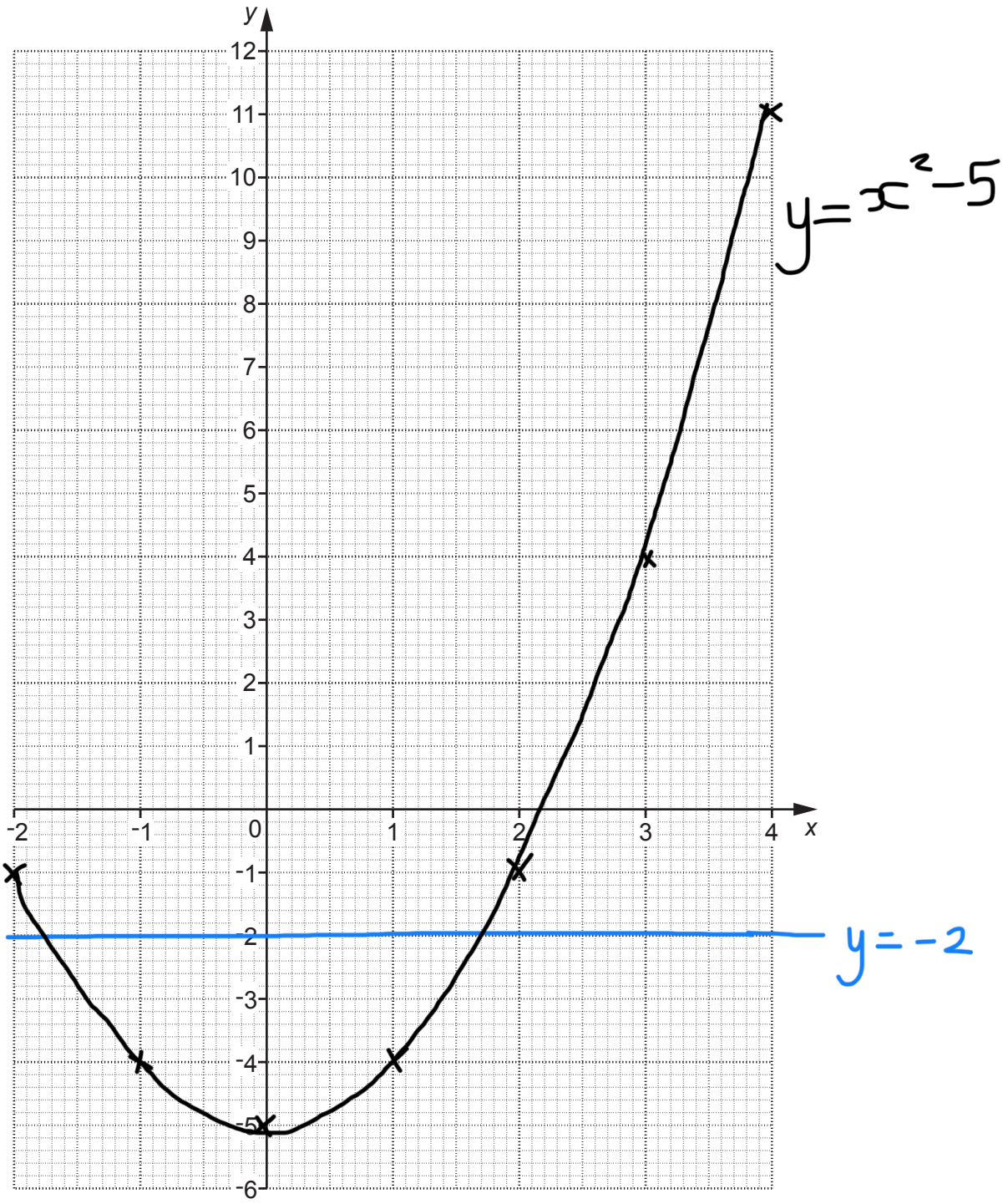
Deanna: ..... 14 ..... cakes **[6]**

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

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

[2]

(b) On the grid below, draw the graph of $y = x^2 - 5$ for the values of x from -2 to 4.



[2]

(c) On the same grid, draw the line $y = -2$. **[1]**

(d) Write down the x coordinates of the points where $y = x^2 - 5$ and $y = -2$ cross.

(d) $x =$ -1.7 and $x =$ 1.7 **[2]**

16 Donald swims 3 lengths of a swimming pool in 93 seconds.

(a) Use this information to show that he could swim 100 lengths in under 55 minutes. **[4]**

3 lengths = 93 seconds

1 length = $\frac{93}{3}$ = 31 seconds

100 lengths = 3100 seconds

(b) What assumption did you make in part **(a)**?

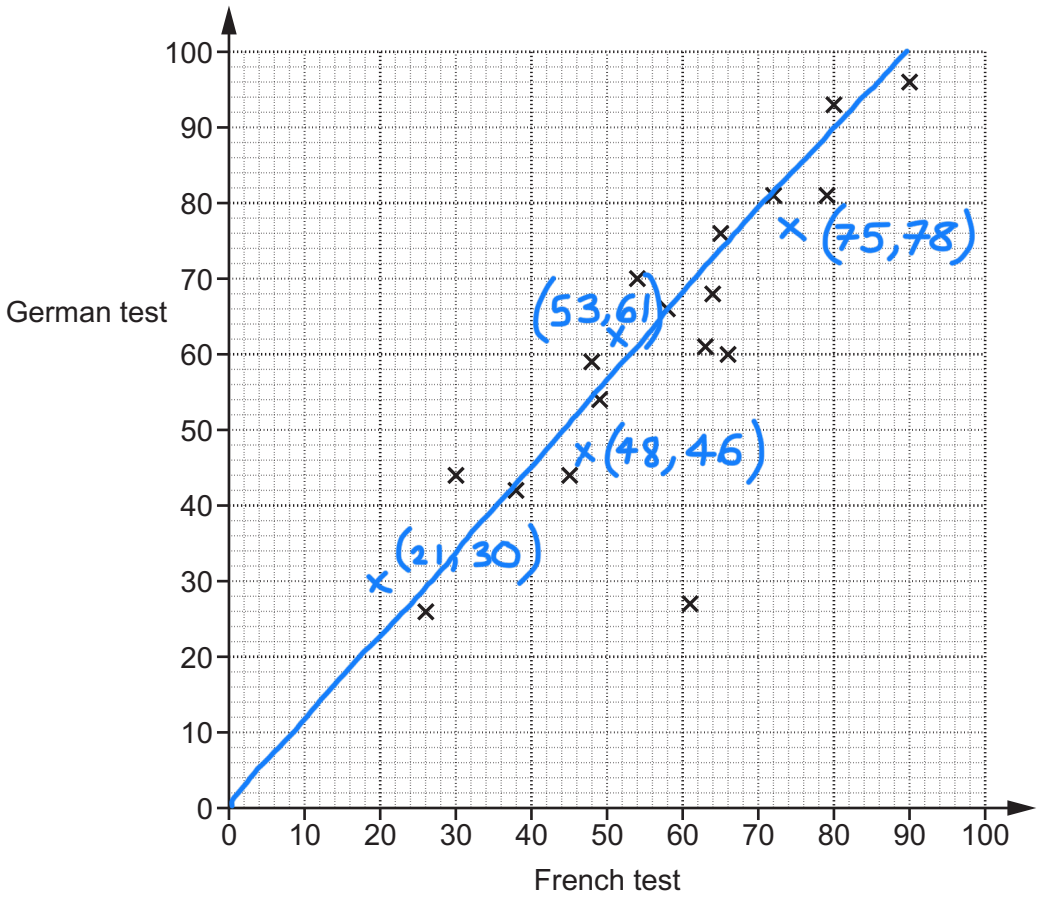
He swims at the same speed / rate the whole time. **[1]**

(c) Donald tries to swim the 100 lengths in under 55 minutes.

Suggest one reason why he might not achieve this.

He will get tired out as time progress, and will slow down. **[1]**

17 The scatter diagram shows the results of 17 students in their French test and their German test. Both tests are out of 100.



(a) Here are the results of another 4 students.

French	21	75	48	53
German	30	78	46	61

Plot these results on the scatter diagram. **[2]**

(b) Describe the type and strength of the correlation shown in this diagram.

(b) strong positive ..... **[2]**

(c) Work out the percentage of the students whose German result was **higher** than their French result.

Count number above $y = x$ line : 15

Total : 21

Percentage : $\frac{15}{21} \times 100\% = 71.4\%$

(c) 71.4 ..... % **[4]**

18 Maria mixes white paint and red paint in the ratio 2 : 3.
She makes a total of 15 litres of paint.

How much more red paint does she need to add to the mixture so that the ratio of white paint to red paint becomes 1 : 5?

2 : 3 $\longrightarrow$ 2 + 3 = 5 parts

Litres in each part : 15 ÷ 5 = 3

White : 2 × 3 = 6 litres

Red : 3 × 3 = 9 litres

New ratio : 1 : 5 (×6) $\rightarrow$ 6 : 30 (×6)

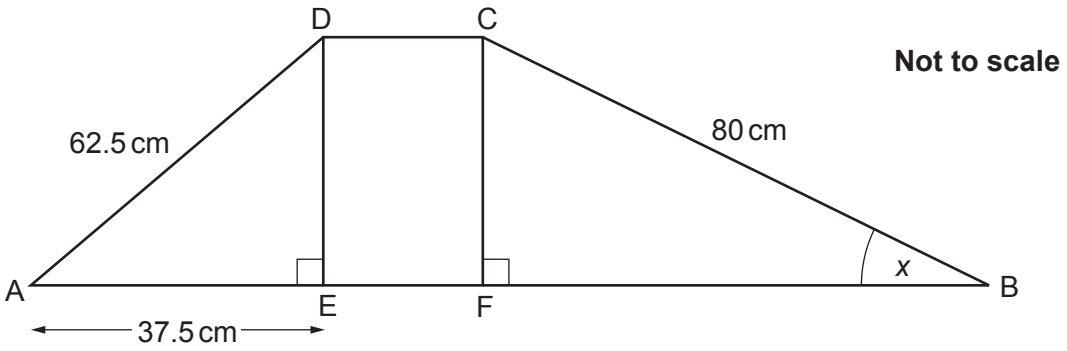
Needs 30 litres of red.

30 − 9 = 21 litres

21 ..... litres **[4]**

19 In the diagram below, ABCD is a trapezium.
Length AE is 37.5 cm.
DE = CF

Find the value of angle *x*.



Find length DE :

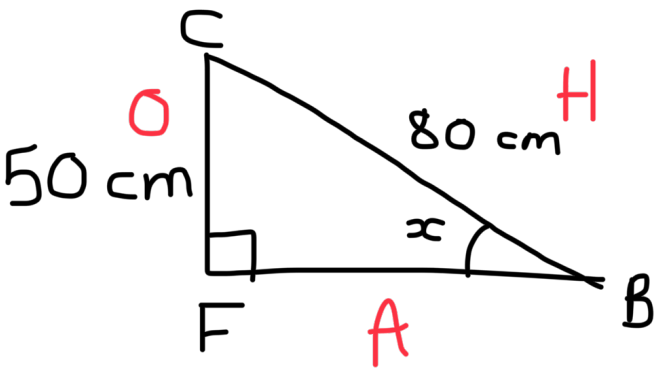
$a^2 + b^2 = c^2$

$DE^2 = 62.5^2 - 37.5^2$

$DE^2 = 2500$

$DE = 50$ cm

$\therefore CF = 50$ cm

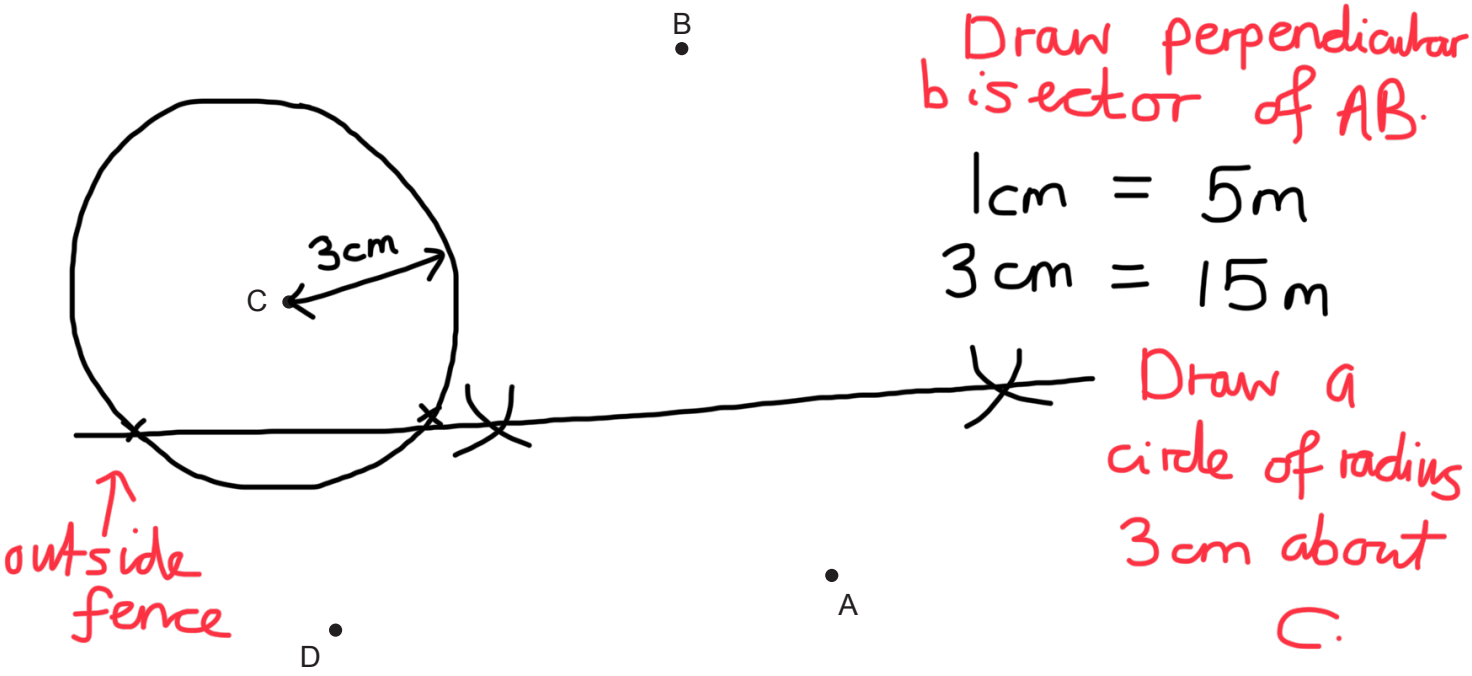


$\sin x = \frac{O}{H} = \frac{50}{80}$

$x = 38.7°$

$x =$ 38.7 ° **[6]**

20 Four points A, B, C and D are shown on the scale diagram below.



Scale: 1 cm represents 5 m

(a) On the diagram, construct and mark the two points that are

- the same distance from A and B

and

- 15 m from C.

Show all your construction lines. **[5]**

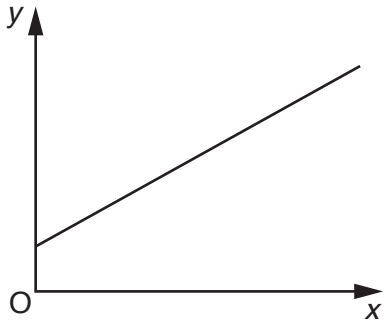
(b) The points A, B, C and D represent the four corners of Monty's garden.
His garden is bounded by four straight fences A to B, B to C, C to D and D to A.

Monty wants to plant a tree in his garden at a place that satisfies the two conditions in part **(a)**.

Explain why there is only one position where Monty can plant his tree.

One of the points is outside of the fence. This is the far left one on the diagram. **[1]**

21 **(a)** A graph is drawn below.



Explain how you know that *y* is not directly proportional to *x*.

Directly proportional graphs pass through the origin, as $y=0$, when $x=0$. However the origin, so is not directly proportional. [1]

(b) *q* is directly proportional to *r*.
q is 68 when *r* is 20.

Work out *q* when *r* is 25.

$q \propto r$

$q = kr$

$68 = 20k$

$3.4 = k$

$q = 3.4r$

$q = 3.4 \times 25$

$q = 85$

(b) 85 **[2]**

END OF QUESTION PAPER