A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

GCSE

MATHEMATICS

H

Higher Tier   Paper 1 Non-Calculator

8300/1H

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

For this paper you must have:
- **mathematical instruments**
- **the Formulae Sheet (enclosed).**

You must NOT use a calculator.

INSTRUCTIONS

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**

- **Answer ALL questions.**

- **You must answer the questions in the spaces provided. Do not write on blank pages.**

- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**

- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **The marks for questions are shown in brackets.**

- **The maximum mark for this paper is 80.**

- **You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.**

ADVICE

In all calculations, show clearly how you work out your answer.

DO NOT TURN OVER UNTIL TOLD TO DO SO

Answer ALL questions in the spaces provided.

1   **Which of these is the equation of a straight line?**

   Circle your answer. [1 mark]

   $y = 6x^2$ $y = x - 6$ $y = x^2 + 6$ $y = \dfrac{6}{x}$

2   **What is 0.28 as a fraction of 0.8 ?**

   Circle your answer. [1 mark]

   $\dfrac{7}{20}$ $\dfrac{2}{7}$ $\dfrac{20}{7}$ $\dfrac{7}{2}$

3   **Circle the calculation that increases 240 by 7.5%
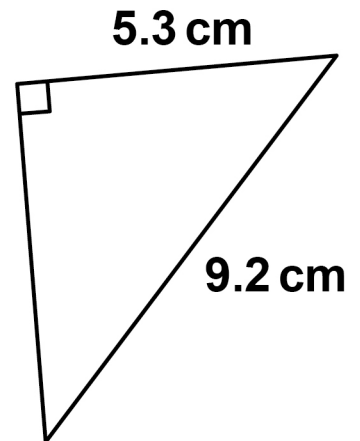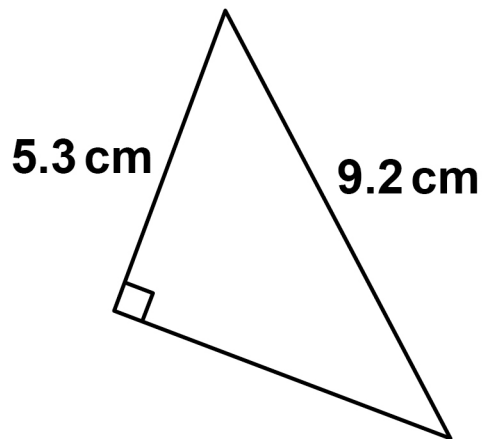   [1 mark]**

   240 × 1.0705   **240 × 1.705**

   240 × 1.075   **240 × 1.75**

4 **The diagram is not drawn accurately.**

Circle the reason why the triangles are congruent.
[1 mark]

ASA   **RHS**   **SAS**   **SSS**

[Turn over]

5   **Work out   80 000 000 ÷ 200**

Give your answer in standard form. [2 marks]

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

6

6(a) **Work out** $\dfrac{3^{12}}{3^7}$

Give your answer as a whole number. [2 marks]

_____

_____

_____

_____

_____

Answer _____

[Turn over]

6(b) **Simplify** $8 \times 2^6 \times 2^4$

Give your answer as a power of 2 **[2 marks]**

Answer _____

BLANK PAGE

[Turn over]

7   In a group of 98 students

25 study both Art and French
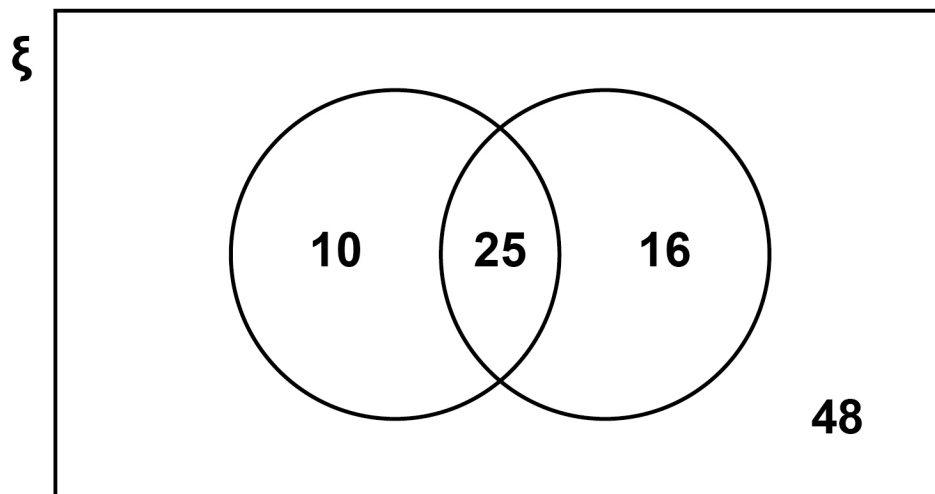
10 study Art but do not study French

41 study French.

Joel draws this Venn diagram to represent the information.

ξ = the group of 98 students

A = the students who study Art
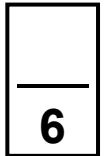
F = the students who study French

ξ

10   25   16

48

Make TWO criticisms of his diagram. [2 marks]

Criticism 1 _____

_____

_____

Criticism 2 _____

_____

_____

6

8   In a week, Samir is paid

a basic hourly rate for the first 30 hours worked
an overtime hourly rate for any extra hours
worked.

The graph, on the opposite page, shows his pay
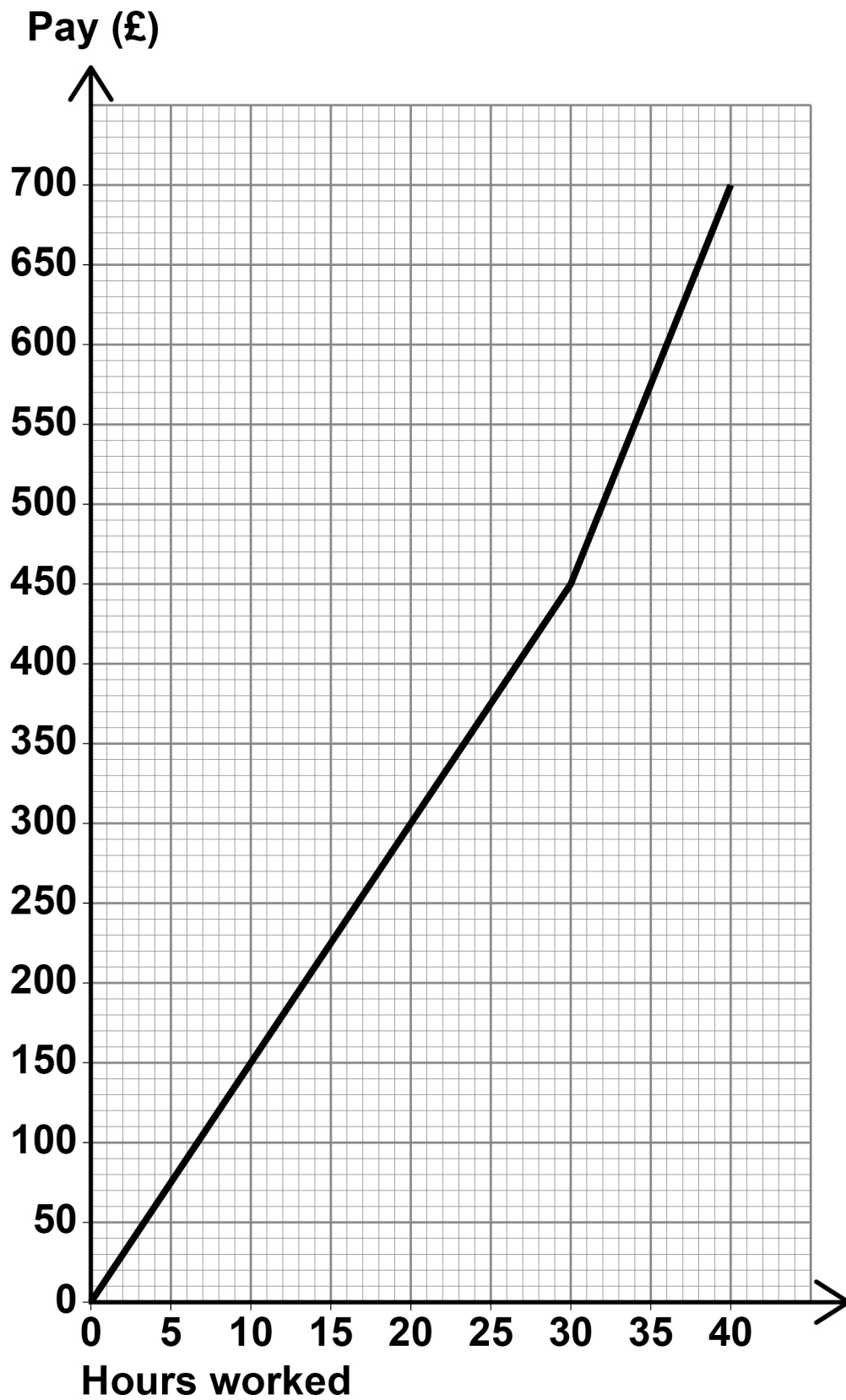for working up to 40 hours in a week.

Work out the ratio

basic hourly rate : overtime hourly rate

Give your answer in its simplest form.   **[3 marks]**

_____

_____

_____

_____

_____

_____

Answer _____ : _____

Pay (£)

Hours worked

[Turn over]

9 (a) In each box, write a fraction LESS than 1 to make a correct calculation. [1 mark]

$$\boxed{\quad \underline{} \quad} \times \boxed{\quad \underline{} \quad} = \frac{3}{10}$$

9 (b) In each box, write a decimal LESS than 1 to make a correct calculation. [1 mark]

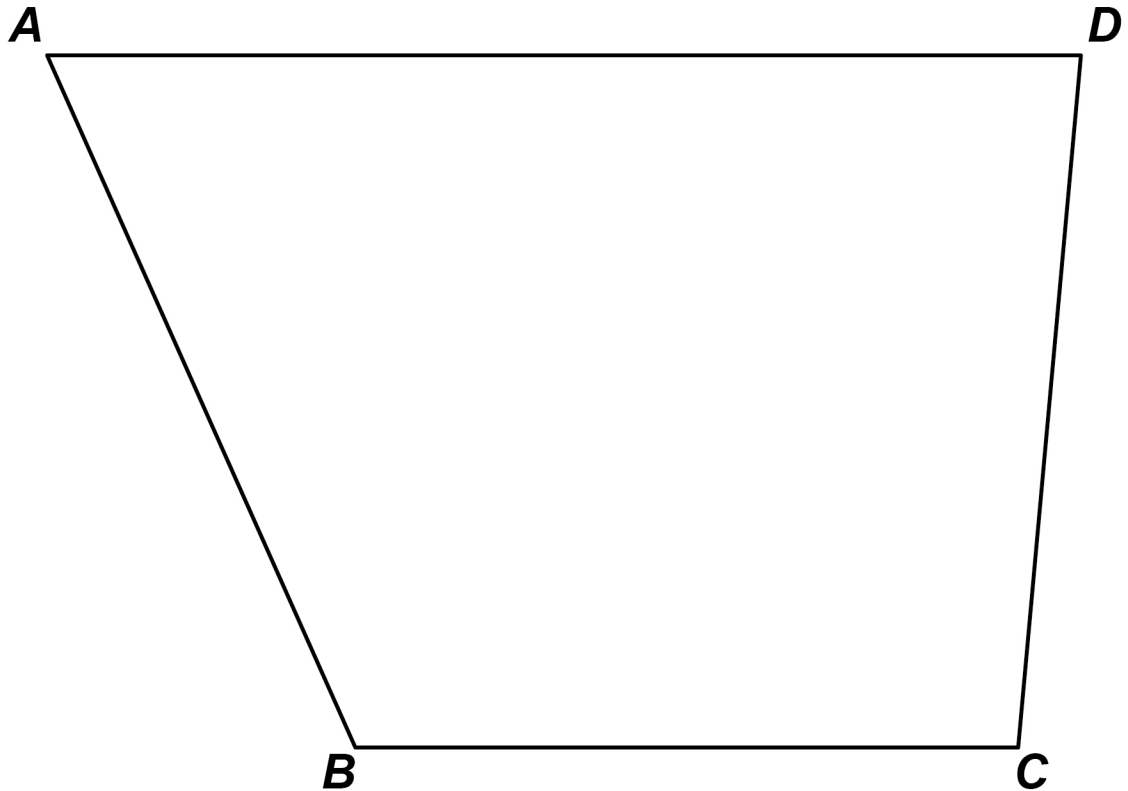$$\boxed{\qquad} \times \boxed{\qquad} = 0.06$$

$$\boxed{\frac{}{5}}$$

BLANK PAGE

[Turn over]

10   **Use a ruler and compasses in this question.**

     ABCD **represents a garden.**

A   *D*

B   *C*

A tree is to be planted in the garden.

The tree will be in the region that is closer to *AB* than to *BC*.

Label the region, R, where the tree could be planted.

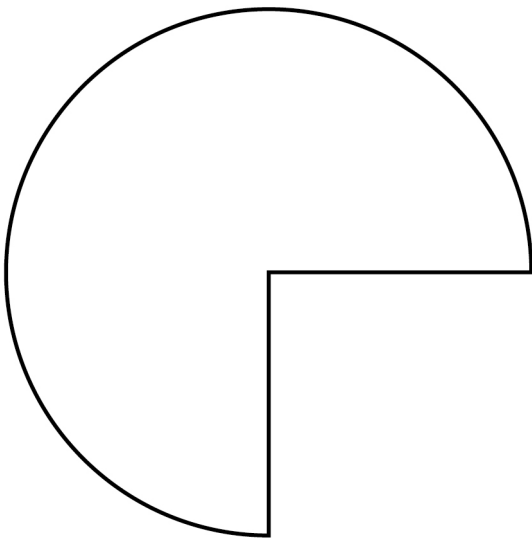Show all your construction lines. [3 marks]

[Turn over]

11 **Here are two shapes, P and Q.**
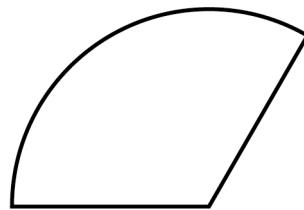
The diagram is not drawn accurately.

P

$\frac{3}{4}$ **of a circle, radius 20 cm**

Q

$\frac{1}{3}$ **of a circle, radius 15 cm**

How many times bigger is the area of P than the area of Q?

You MUST show your working. [4 marks]

_____

_____

_____

_____

_____

_____

Answer _____

$$\frac{}{7}$$

12 **In a game, two bags, A and B, contain cards.**

Each card is marked Yes or No.

The table shows the number of each type of card in the bags.

	Yes	No
BAG A	3	2
BAG B	1	9

In the game, a player picks one card at random from each bag.

The cards are then put back into the bags.

12 (a) **Complete the tree diagram, on the opposite page. [2 marks]**

BAG A

BAG B

Yes

_____

_____

Yes

No

Yes

_____

_____

No

No

_____

Yes

_____

No
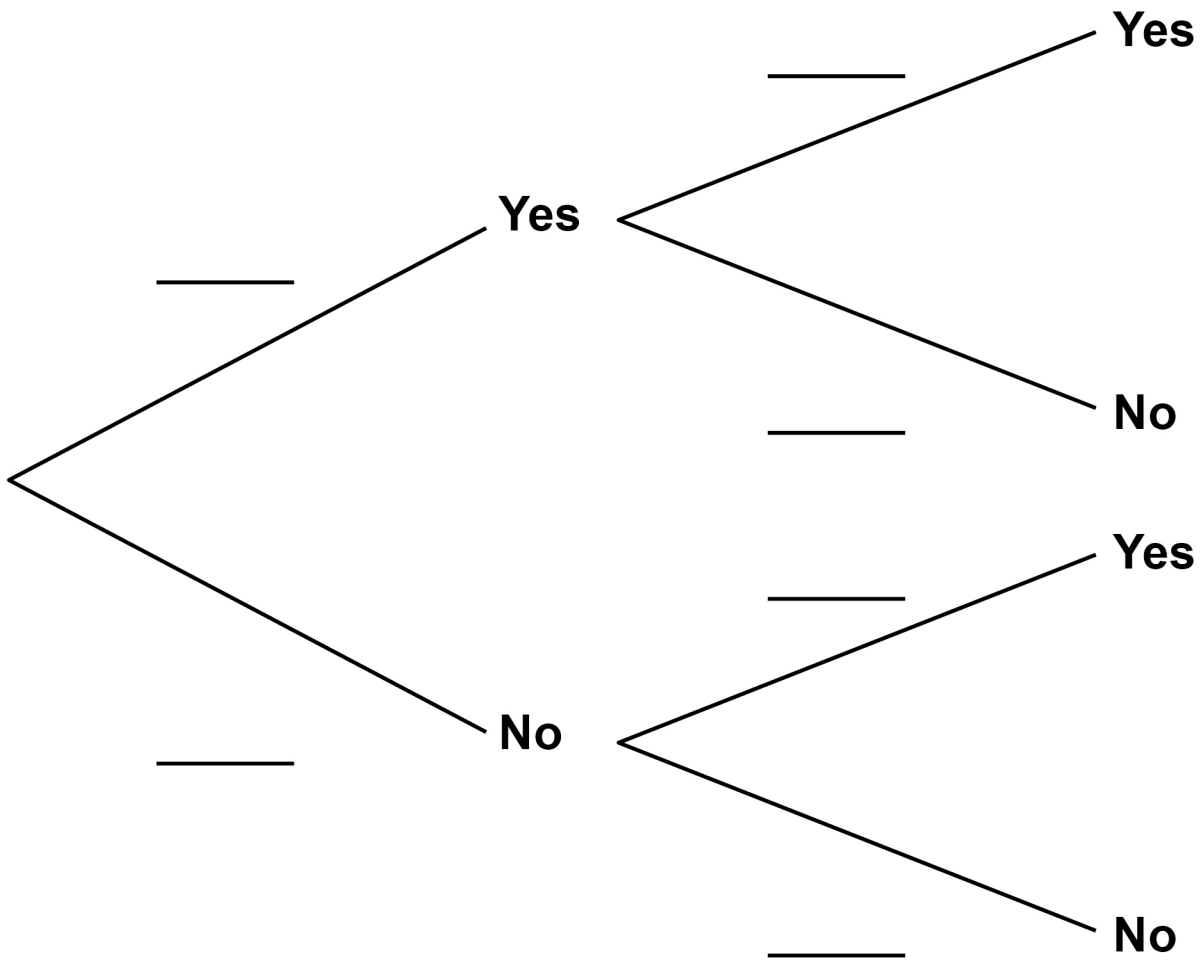
[Turn over]

BLANK PAGE

12 (b) **To win a prize, a player must pick two cards marked Yes.**

450 people each play the game once.

How many people are expected to win a prize? [3 marks]

_____

_____

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_____

Answer _____

13   **Solve** $\dfrac{2w}{15} = \dfrac{4}{5}$ **[2 marks]**

$w =$ _____

7

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14   **15 workers can complete a job in 8 days.**

How many MORE workers are needed to complete the job in 6 days?

Assume that all of the workers work at the same rate. [3 marks]

_____

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Answer _____

15 **The cross section of a prism has n sides.**

Circle the expression for the number of faces of the prism. [1 mark]

n $\qquad$ $2n$ $\qquad$ $3n$ $\qquad$ $n + 2$

[Turn over]

16 Circle the letter of the possible sketch graph of
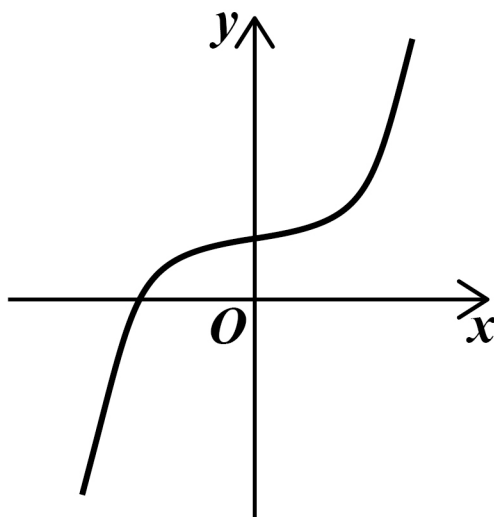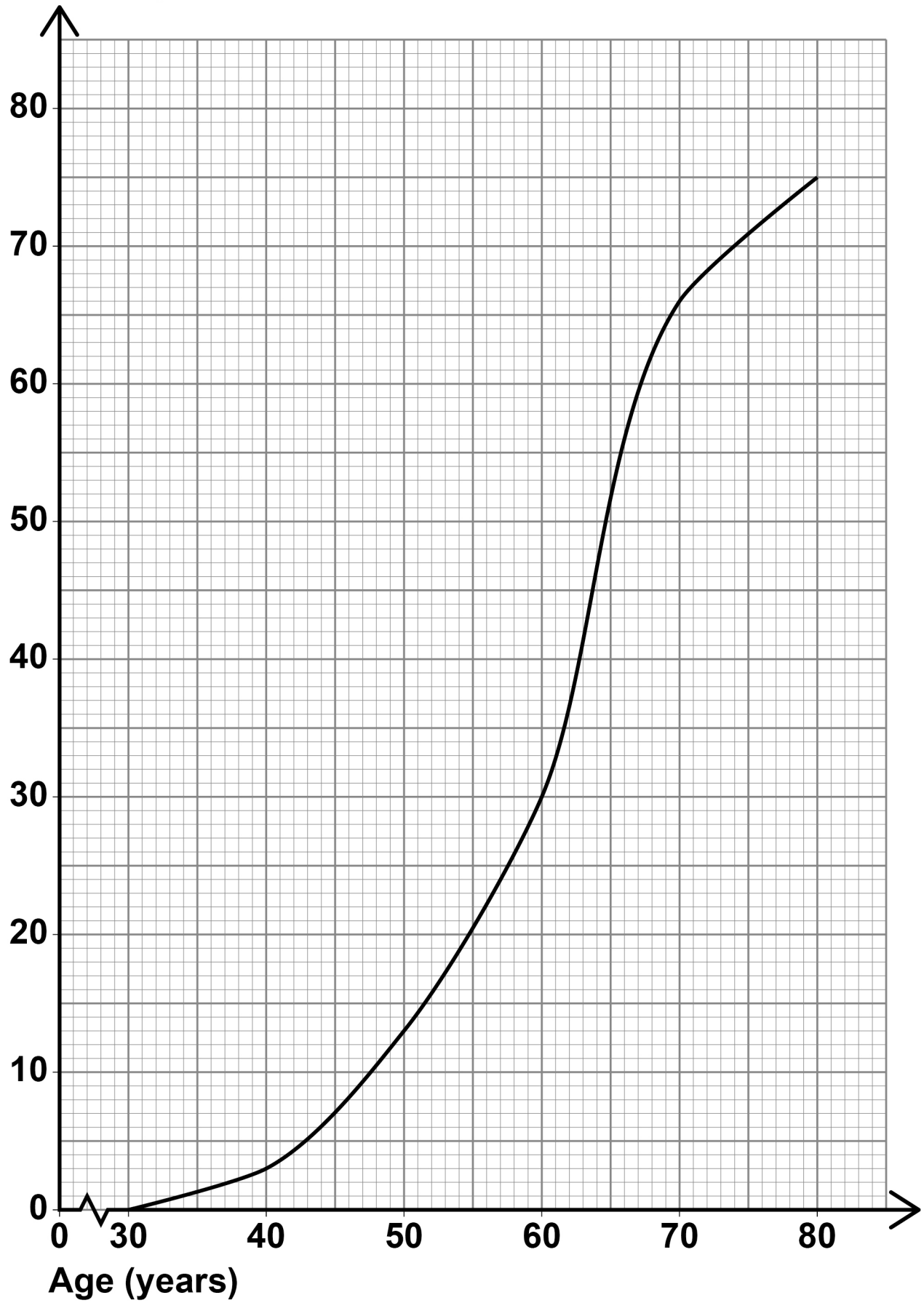 $y = x^3 - 4$ [1 mark]

A

B

C

D

5

2 8
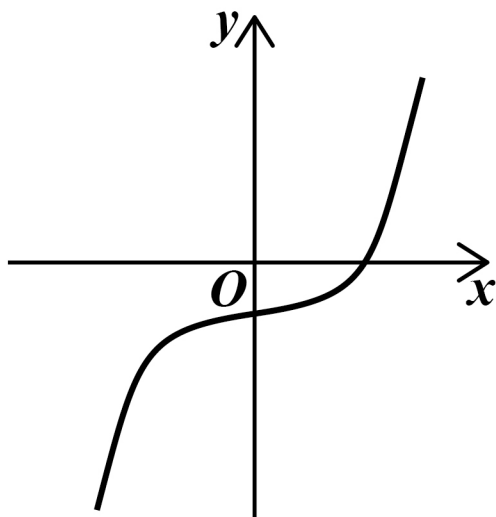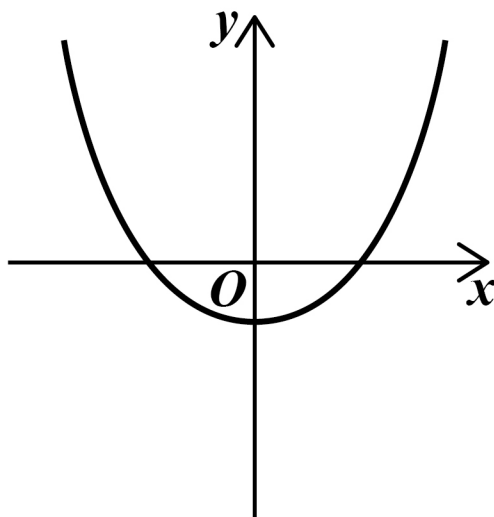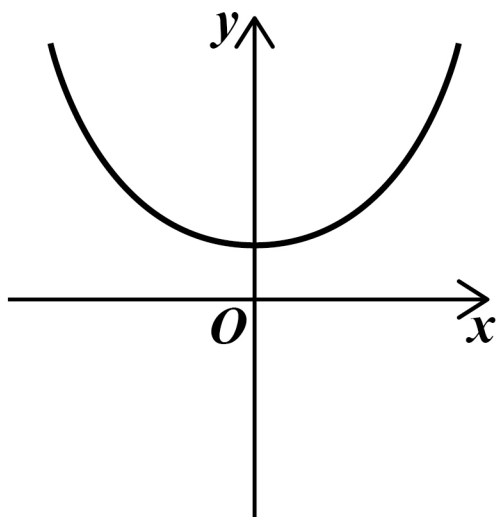
17   **75 people attend a clinic.**

Their ages are recorded and a cumulative frequency diagram is drawn, on page 30.

[Turn over]

29

Cumulative frequency

Age (years)

A nurse makes a statement about the AGES of the people at the clinic.

He says,

"More than twice as many people are in their 60s as in their 50s."

Is he correct?

Tick a box.

Yes ☐

No ☐

Show working to support your answer. [3 marks]

_____

_____

_____

_____

_____

_____

[Turn over]

_____

_____

_____

_____

_____

_____

3

BLANK PAGE

[Turn over]

18 $12x^3 + 7x^2 + 3x - 10 \equiv 2(ax^3 + x^2 + 2x - 5) + x(bx + c)$

Work out the values of a, b and c.   **[3 marks]**

_____

_____

_____

_____

a = _____ *b* = _____ *c* = _____

[Turn over]

19 The first three terms of a sequence are

x $\quad$ y $\quad$ xy

The sequence is continued by multiplying the previous two terms.

19(a) Circle the 5th term of the sequence. **[1 mark]**

x^3y^3 $\qquad\qquad$ x^5y^5 $\qquad\qquad$ x^3y^4 $\qquad\qquad$ x^2y^3

19(b) The 8th term of the sequence is x^8y^{13}

The value of this term is negative.

What does this mean about the values of x and y ?

Tick ONE box for each row. **[2 marks]**

	Must be positive	Must be negative	Could be either
x			
y			

6

BLANK PAGE

[Turn over]

20 **Rearrange** $y = \dfrac{5x + 9}{x}$ **to make x the subject.**

[4 marks]

Answer _____

[Turn over]

21 **Five points are connected by vectors.**

The diagram is not drawn accurately.
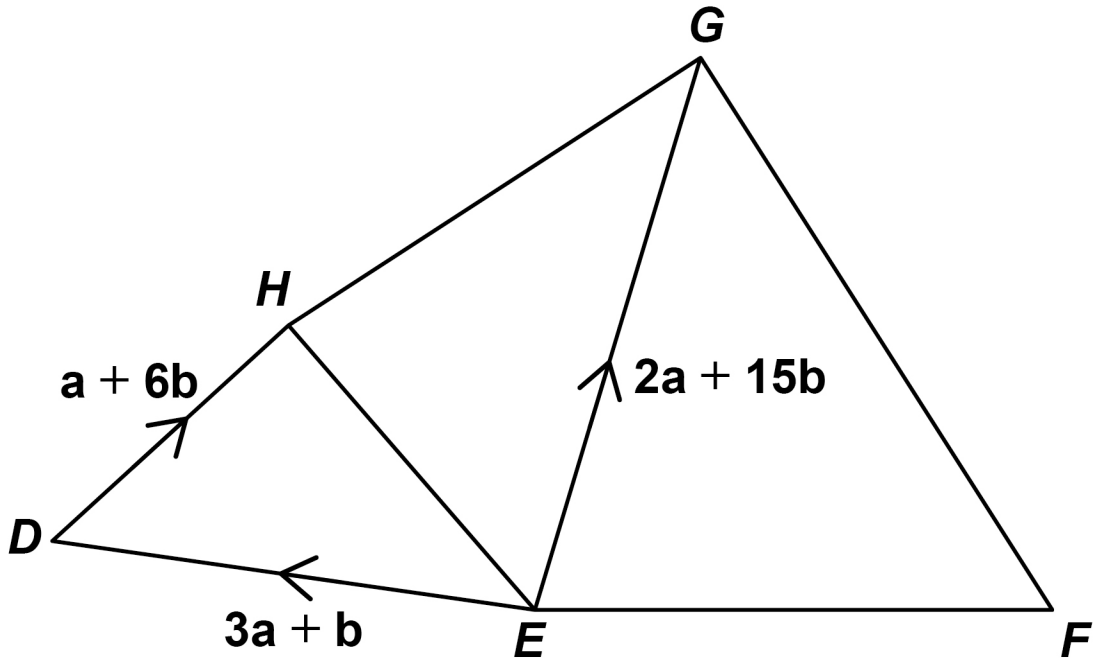
$\overrightarrow{FG} = 2\overrightarrow{EH}$

Work out $\overrightarrow{FE}$ **in terms of a and b. [4 marks]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

[Turn over]

8

22 **Work out** $0.6\dot{8} - 0.4\dot{5}$

Give your answer as a fraction in its simplest form. **[5 marks]**

Answer

[Turn over]

23 **On the grid, identify the region represented by**

$x > 3$ and $y > 1$ and $x + y \leqslant 7$

Label the region R. [3 marks]
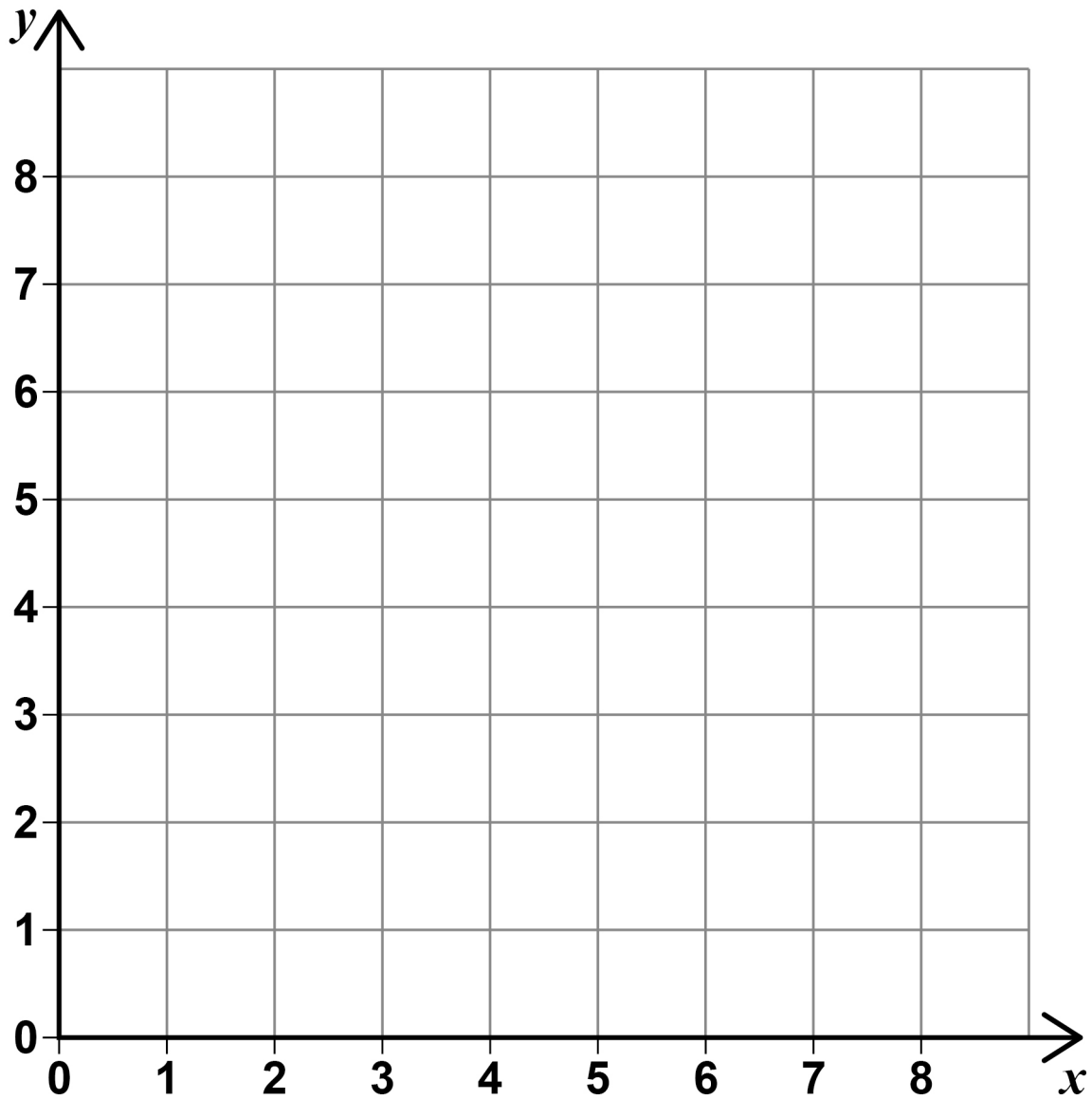
24(a) **Simplify fully** $\dfrac{6}{a} - \dfrac{11}{4a}$ **[2 marks]**

Answer _____

[Turn over]

24(b) **Simplify fully** $(y^2 - 3y) \times \dfrac{y^2 + 10y + 21}{y^2 - 9}$

[4 marks]

Answer

[Turn over]

25 Here is the speed-time graph for a 50-second journey.

Speed (m/s)

Time (s)
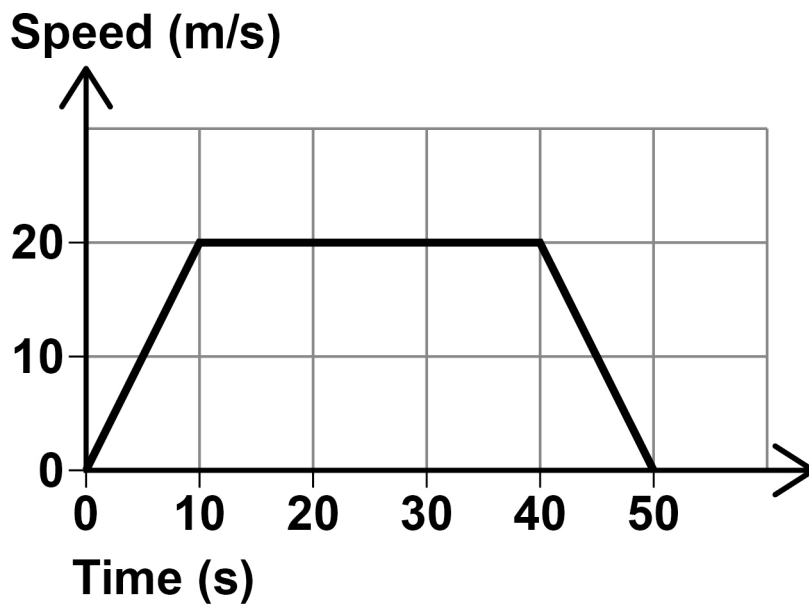
25 (a) Circle the acceleration, in m/s^2, halfway through the journey. [1 mark]

0   2   20   25

25 (b) Work out the total distance travelled. [2 marks]

_____

_____

_____

_____

_____

_____

Answer _____ **m**

[Turn over]

9

26 **Zoe and Amy are playing a board game.**

- **They each have one disc and take turns to roll a fair, ordinary dice.**

- **The player moves their disc CLOCKWISE the number of spaces shown on the dice.**

- **The winner is the first player whose disc is on HOME at the end of a turn.**

Here is the board after Amy's turn.

Direction of play
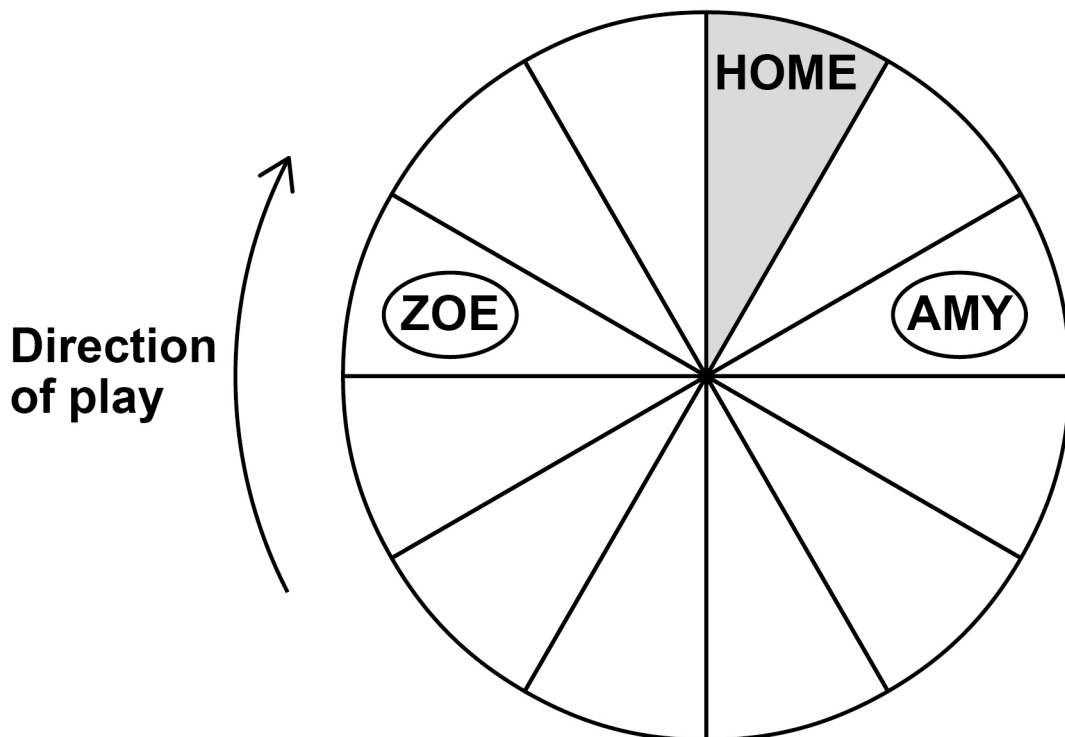
Work out the probability that Zoe wins within her next two turns. [4 marks]

Answer _____

27 **The grid shows the graph of** $y = f(x)$
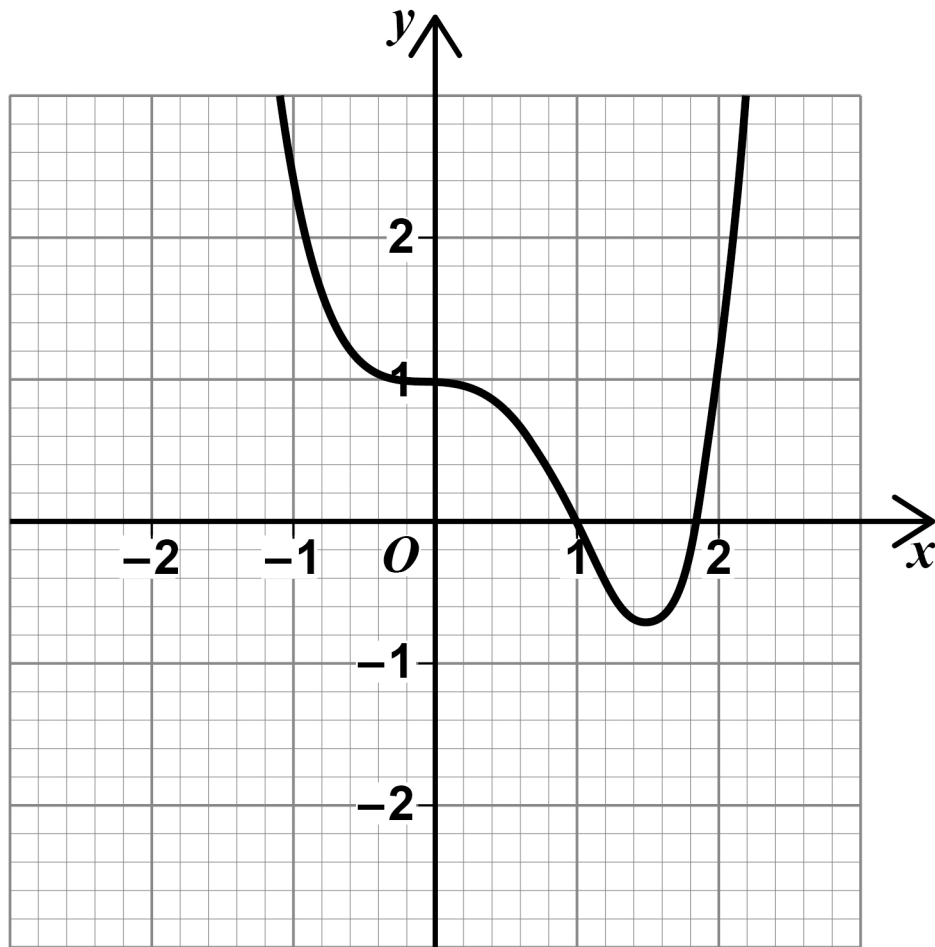
On the grid, draw the graph of $y = -f(x)$
[2 marks]

6

BLANK PAGE

[Turn over]

28 **Work out the value of**
$(\cos 30° × \sin 45° × \tan 60°)^2$ **[4 marks]**

Answer _____

END OF QUESTIONS

4

Additional page, if required.
Write the question numbers in the left-hand margin.

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Write the question numbers in the left-hand margin.

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