AQA

PRACTICE PAPER SET 3

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

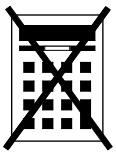
Higher Tier Paper 1 Non-Calculator

Date of Exam Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- mathematical instruments.

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 outside the box around each page or on blank pages.
- 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.

Answer **all** questions in the spaces provided.

1 What is the area, in cm^2, of a semicircle of radius 6 cm?

Circle your answer.

[1 mark]

6π 12π 18π 36π

2 Expand $3x^2(2x - 5)$

Circle your answer.

[1 mark]

$-9x$ $6x^3 - 5$ $5x^3 - 8x^2$ $6x^3 - 15x^2$

3 Circle the solution of $2x + 8 > 4$

[1 mark]

$x > -6$ $x > -2$ $x > 2$ $x > 6$

4 Circle the calculation that increases 50 by 200%

[1 mark]

50×1.2 50×2 50×2.2 50×3

5 Solve $\frac{x}{3} - 9 = 12$

[2 marks]

$x =$ _____

Turn over for the next question

6 The air pressure in a tyre measures 7.2 bar.

Air is leaking out at the rate of 0.2 bar per day.

6 (a) Assume that the air continues to leak at the same rate.

After how many days will the pressure measure 4.8 bar?

[2 marks]

Answer _____

6 (b) In fact, the rate that the air leaks out increases each day.

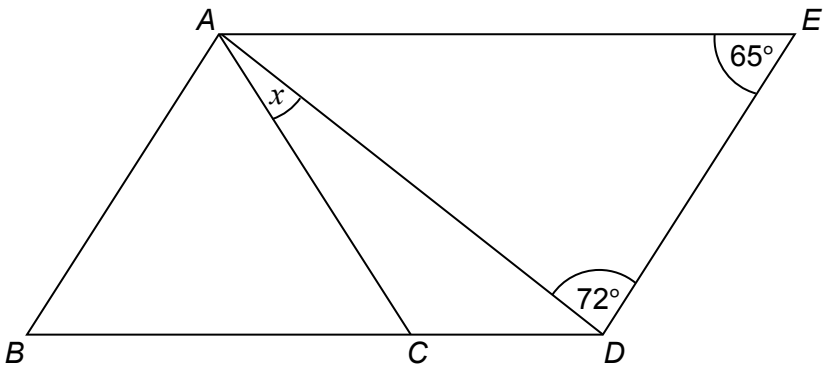
How does this affect your answer to part (a)?

[1 mark]

7 *ABDE* is a parallelogram.

$AB = AC$

Not drawn accurately



Show that $x = 22°$

[3 marks]

8 (a) Here are the fourth and fifth terms of a Fibonacci-type sequence.

28 43

Each term is the sum of the previous two terms.

Show that the first term is 2

[2 marks]

8 (b) Here are the first and third terms of a different Fibonacci-type sequence.

a b

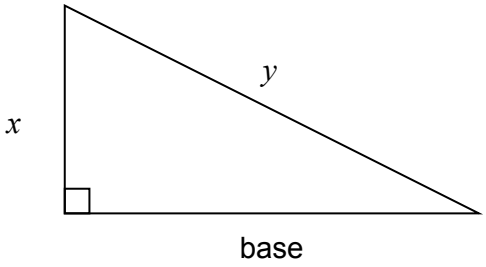
Each term is the sum of the previous two terms.

Work out an expression in terms of a and b for the fifth term.

[3 marks]

Answer

9 Noah is attempting to work out the base of **different** right-angled triangles.



Not drawn accurately

Here is his method with the working for y = 10 and x = 6

Work out the value of y^2	$10^2 = 100$
Work out the value of x^2	$6^2 = 36$
Work out the value of $y^2 - x^2$	$100 - 36 = 64$
The base is $\sqrt{y^2 - x^2}$	base $= \sqrt{64}$

Tick the correct statement.

[3 marks]

☐ The method will **always** give an answer which is a whole number.

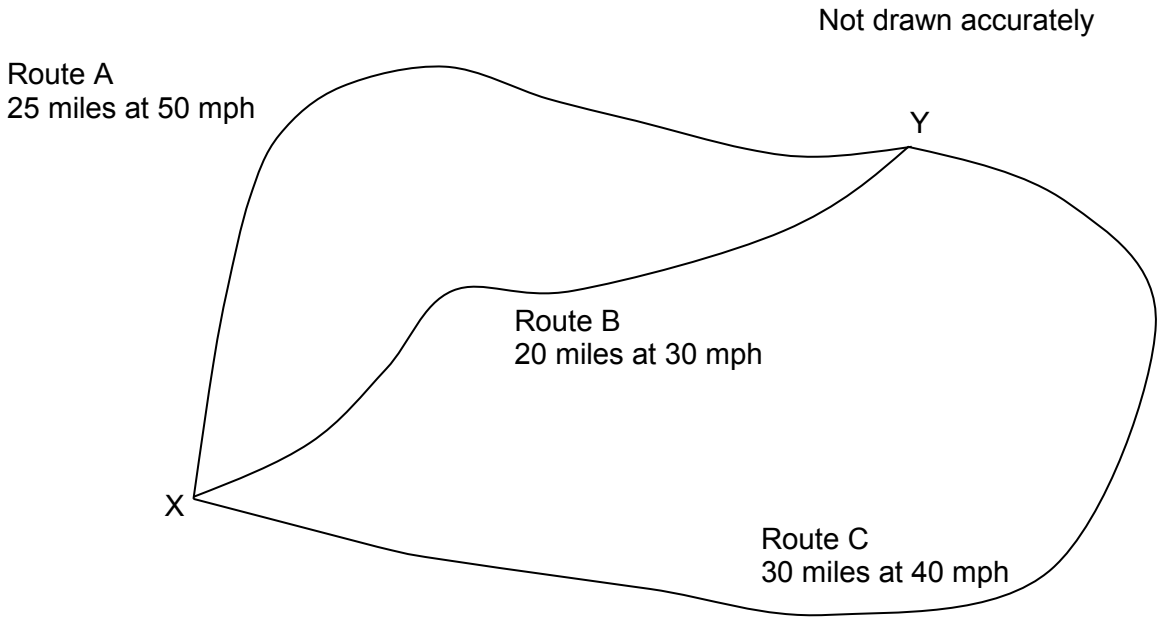
☐ The method will **sometimes** give an answer which is a whole number.

☐ The method will **never** give an answer which is a whole number.

Show working to support your answer.

10 The diagram shows three routes, A, B and C, between two towns, X and Y.

The distance and average speed for each route is shown.



10 (a) Which of the three routes takes the longest time?

Assume the average speeds given.

You **must** show your working.

[4 marks]

Answer _____

10 (b) Jon and Matt take the same time to travel from X to Y.

Jon travels along route B at 10 mph **faster** than the average speed.

Matt travels along route C.

Does Matt travel faster or slower than the average speed for route C, and by how much?

You **must** show your working.

[3 marks]

Tick a box.

Faster ☐ Slower ☐

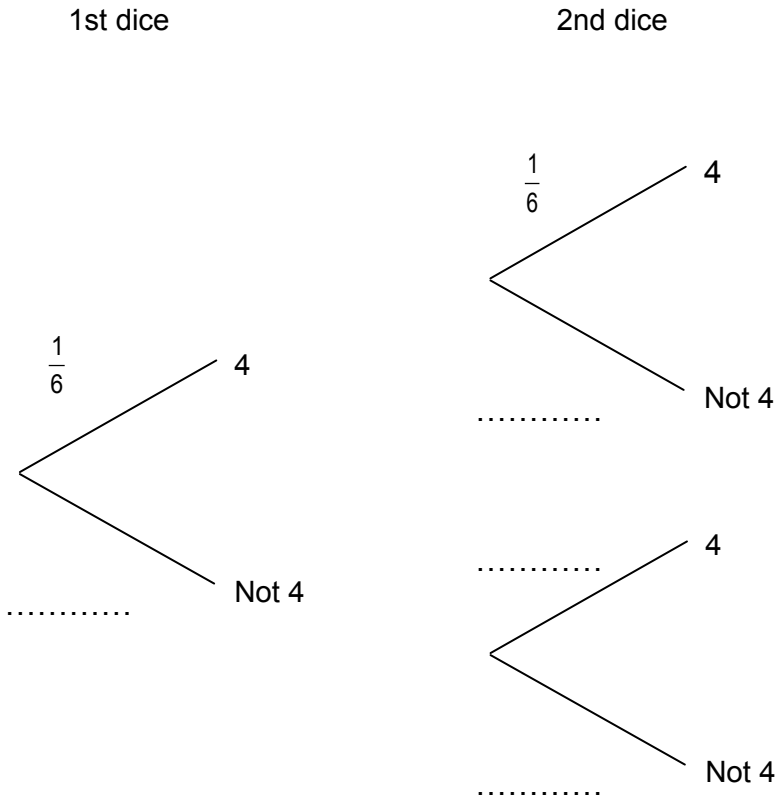
Answer _____ mph

Turn over for the next question

11 Two ordinary fair dice are rolled.

11 (a) Complete the tree diagram.

[1 mark]



11 (b) Circle the probability that **both** dice land on 4

[1 mark]

$\frac{1}{4}$ $\frac{2}{12}$ $\frac{2}{6}$ $\frac{1}{12}$ $\frac{1}{36}$

11 (c) Work out the probability that at least one of the dice does **not** land on 4

[2 marks]

Answer _____

12 $A = \dfrac{(x-4)(x+3)}{x(x-1)}$

12 (a) Work out the value of A when $x = -1$

[1 mark]

Answer _____

12 (b) When $2 < x < 4$

Circle your answer.

[1 mark]

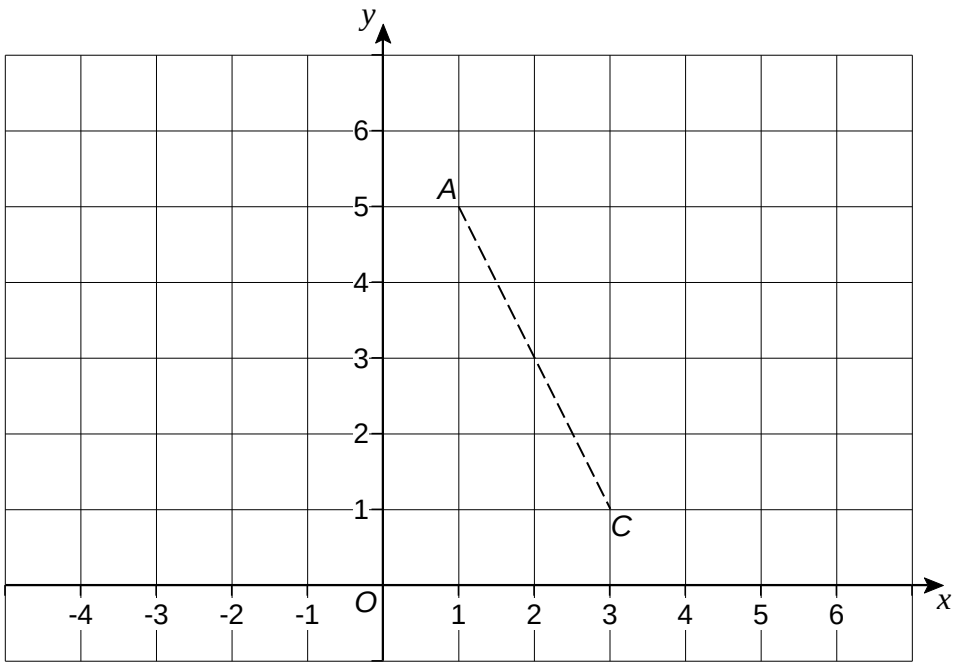
A is positive	A is zero
A is negative	A could be positive or negative or zero

Turn over for the next question

13 (a) *AC* is a diagonal of kite *ABCD*.

A is the point (1, 5)

C is the point (3, 1)



The diagonals of the kite intersect at *M*, the midpoint of *AC*.

$AM = BM$

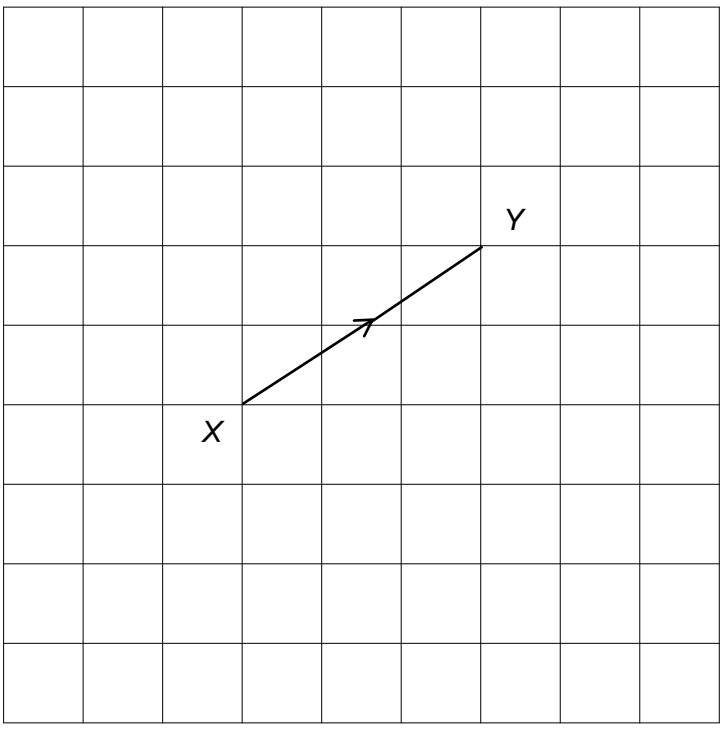
$BM : MD = 1 : 2$

Work out possible coordinates of *B* and *D*.

[2 marks]

B (_____ , _____) and *D* (_____ , _____)

13 (b) $\overrightarrow{XY}$ is the vector $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ on this square grid.



Write down a vector that is

the same size as $\overrightarrow{XY}$

and perpendicular to $\overrightarrow{XY}$

[2 marks]

Answer $\begin{pmatrix} \_\_ \\ \_\_ \end{pmatrix}$

Turn over for the next question

14 Estimate the value of $19.4^2 + 30\sqrt{104}$

[3 marks]

Answer _____

15 Circle the expression that is equivalent to $\frac{2x^2+1}{x}$ where x is not equal to 0

[1 mark]

$2x + 1$ $2x^2 + \frac{1}{2}$ $2x + \frac{1}{x}$ $4x + \frac{1}{x}$

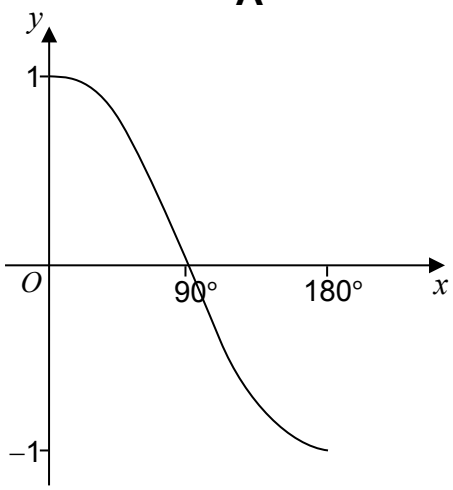
16 One of these is a sketch of $y = \cos x$ for $0° \leqslant x \leqslant 180°$

Which one?

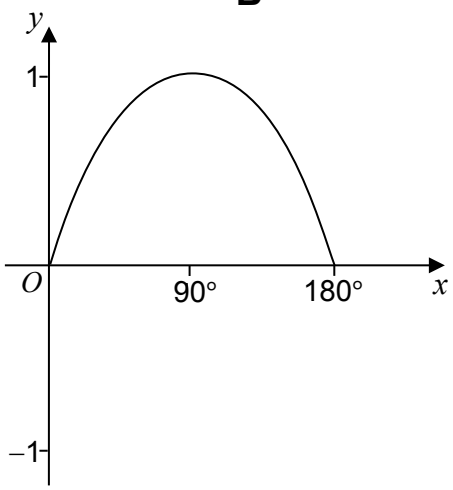
Circle the correct letter.

[1 mark]

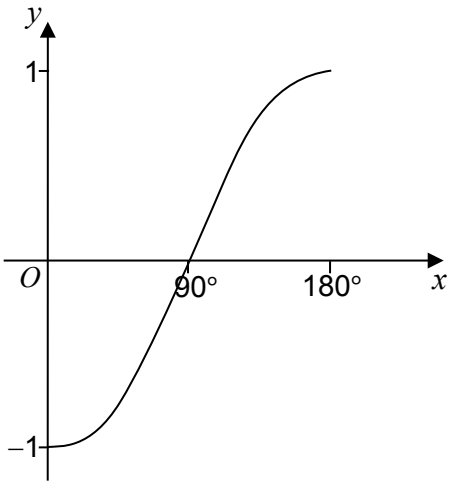
A



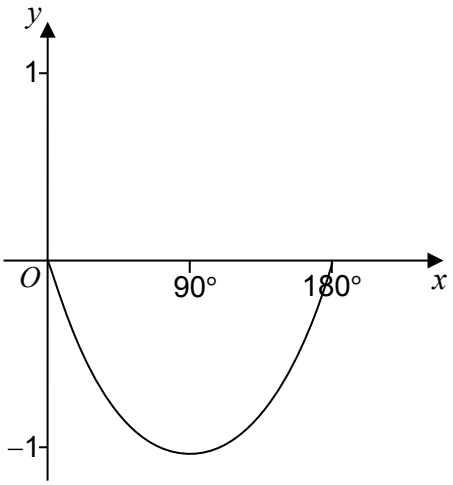
B



C



D



Turn over for the next question

17 Naz buys a fridge from a shop for £189

The cost of delivery is proportional to the distance from the shop.

For 15 miles, the cost is £9

Naz lives 24 miles from the shop.

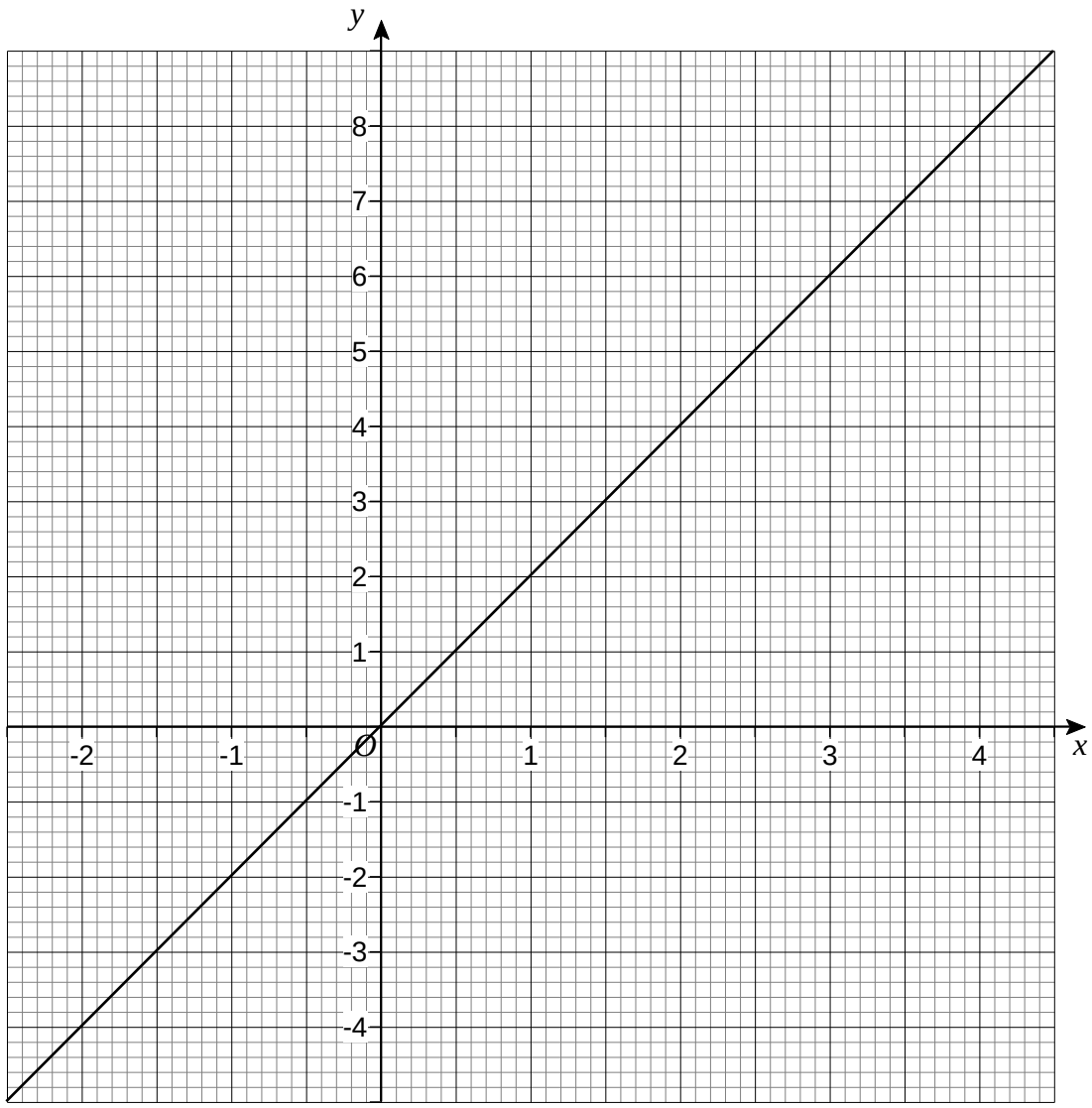
Is the total cost **more** than £200?

You **must** show your working.

[4 marks]

Answer _____

18 The graph of $y = 2x$ is shown.



By drawing the graph $y = 3x^2 - 4$ on the grid,

work out approximate solutions to $3x^2 - 4 = 2x$

[4 marks]

Answer _____

19 (a) Work out the value of $\left(\sqrt{2}\right)^4$

[1 mark]

Answer _____

19 (b) Expand and simplify $(\sqrt{2} + 3)^2$

[2 marks]

Answer _____

20 Work out the value of $9^{-\frac{1}{2}}$

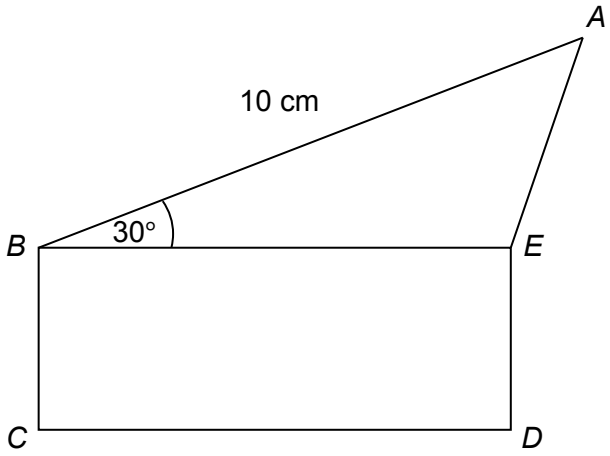
[2 marks]

Answer _____

21 The diagram shows a triangle *ABE* and a rectangle *BCDE*.

area *ABE* = area *BCDE*

BC is 2 cm shorter than *BE.*



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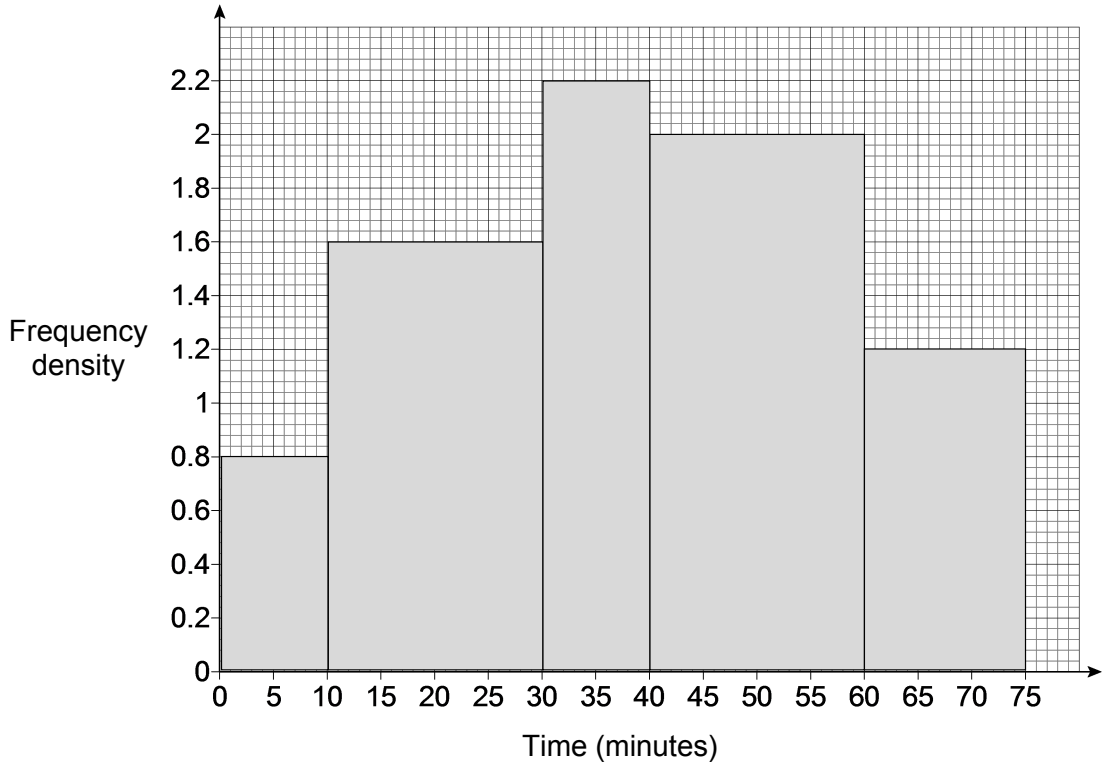
Work out the length of *BE*.

[4 marks]

Answer _____ cm

22 The histogram shows information about the times some students revised for a test.

The first bar represents students who revised for less than 10 minutes.



Estimate the number of students who revised for less than 45 minutes.

[3 marks]

Answer _____

23 Work out the value of $\frac{5}{\sqrt{3}} - \sqrt{6\frac{3}{4}}$

Give your answer in the form $k\sqrt{3}$

[4 marks]

Answer _____

24 Convert $0.2\dot{8}$ to a fraction.

Give your answer in its simplest form.

[3 marks]

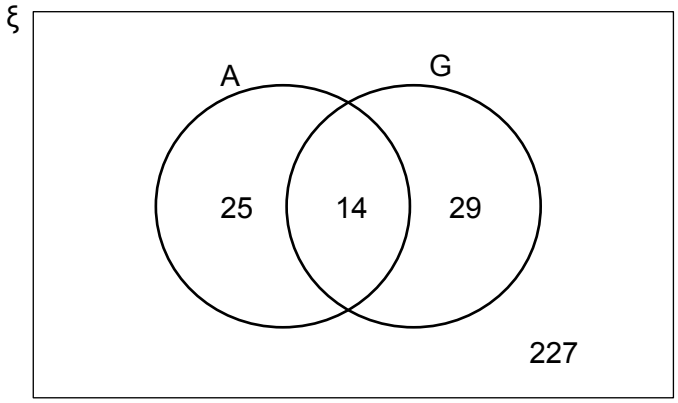
Answer _____

25 In the Venn diagram

ξ = 295 students in a college

A = students who take Art

G = students who take Geography



25 (a) One student is chosen at random.

Work out the probability the student takes Art.

[1 mark]

Answer _____

25 (b) One student who takes Geography is chosen at random.

Work out the probability the student **also** takes Art.

[1 mark]

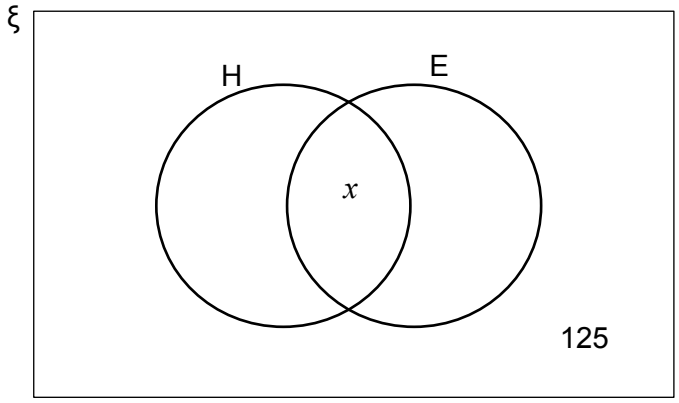
Answer _____

25 (c) In this Venn diagram

ξ = 295 students in the college

H = students who take History

E = students who take English



One-half of the students who take History also take English.

The number who take English is twice the number who take History.

Work out the value of x.

[3 marks]

Answer _____

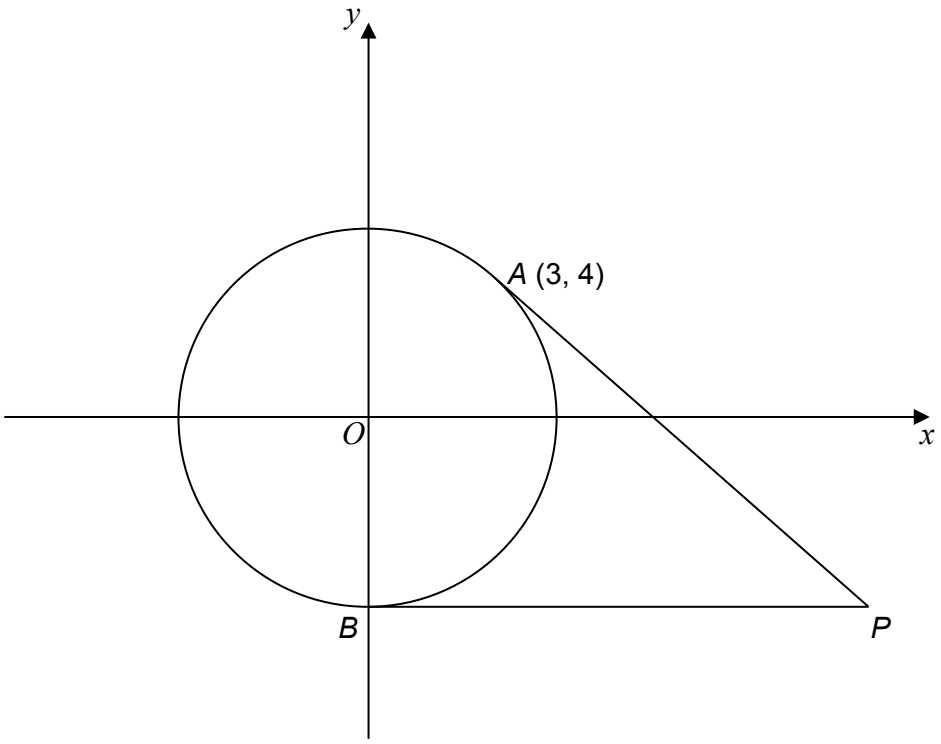
Turn over for the next question

26 A and B are points on the circle with equation $x^2 + y^2 = 25$

A is (3, 4)

B is a point on the y-axis.

PA and PB are tangents.



26 (a) Show that the coordinates of B are $(0, -5)$

[1 mark]

26 (b) Give a reason why $PA = PB$

[1 mark]

26 (c) *P* is the point (a, b)

Work out the values of a and b.

[4 marks]

a = _____

b = _____

END OF QUESTIONS

Do not write outside the box

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED