

"BETWEEN PAPERS"

PRACTICE

SET 4 OF 4 (HIGHER ONLY)

SUMMER 2018

EXAMINERS REPORT &

MARKSCHEME

NOT A "BEST" GUESS PAPER.

**NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!
YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME
UP ON PAPERS 2 OR 3 ...**

**WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE SO WE'VE COLLATED A LOAD OF
QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDExcel 9-1 GCSE MATHS PAPER 1 BUT WE
CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...**

**ENJOY!
MEL & SEAGER**

Q1. Alex is x cm tall.

Bob is 10cm taller than Alex.

Cath is 4cm shorter than Alex.

Write an expression, in terms of x , for the mean of their heights in centimetres.

(3)

Q2. There is a coastguard station at point A and at point B .

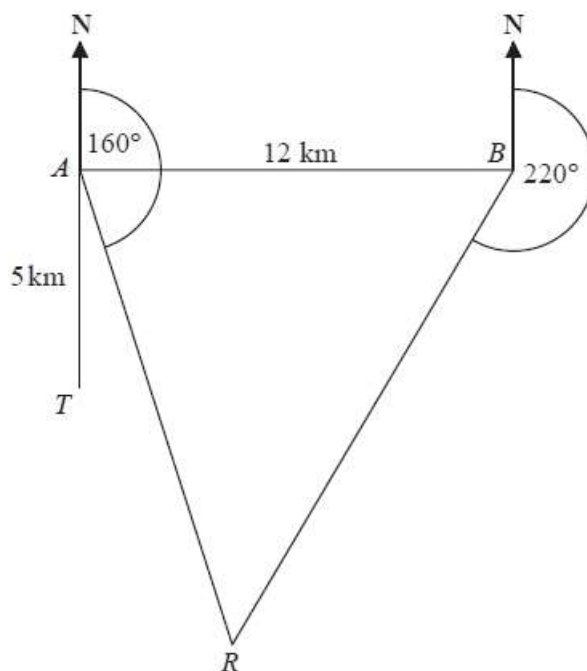
B is due East of A . The distance from A to B is 12 km.

There is a rowing boat at point R . R is on a bearing of 160° from A . R is on a bearing of 220° from B .

There is a speedboat at point T . T is 5 km due South of A .

Work out the shortest distance from T to R .

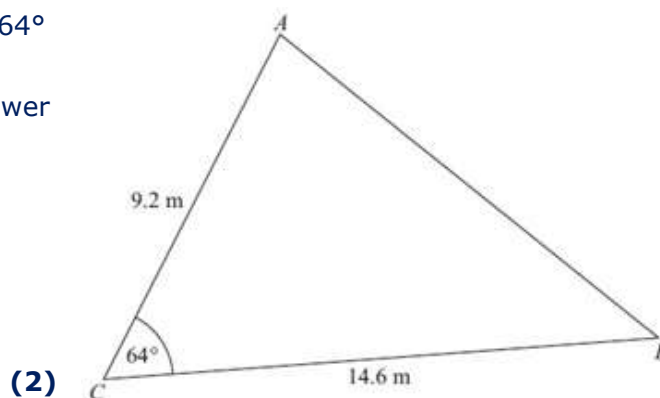
Give your answer correct to 1 decimal place. You must show all your working.



(5)

Q3. $AC = 9.2$ m $BC = 14.6$ m Angle $ACB = 64^\circ$

(a) Calculate the area of the triangle ABC . Give your answer correct to 3 significant figures.



(2)

(b) Calculate the length of AB .

Give your answer correct to 3 significant figures.

(3)

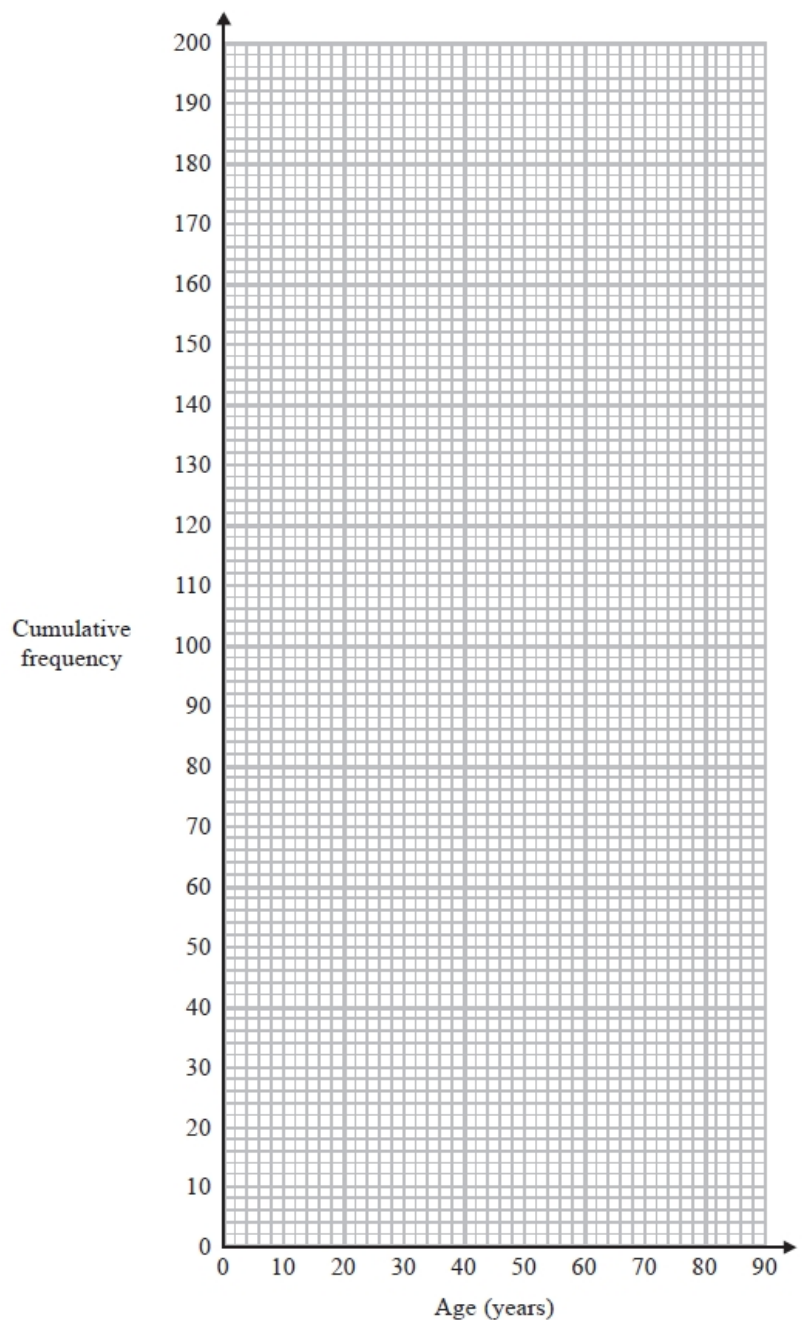
Q4. There are 200 workers at a factory. The cumulative frequency table gives information about their ages.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	25
$0 < a \leq 30$	70
$0 < a \leq 40$	138
$0 < a \leq 50$	175
$0 < a \leq 60$	186
$0 < a \leq 70$	194
$0 < a \leq 80$	200

(a) On the grid opposite, draw a cumulative frequency graph for this information.

(2)

(b) Graham says,
 "10% of workers at the factory are older than 65"
 Is Graham correct? You must show how you get your answer.



(2)

Q5. Using $x_{n+1} = -2 - \frac{4}{x_n^2}$

with $x_0 = -2.5$

(a) find the values of x_1 , x_2 and x_3

$x_1 = \dots\dots\dots$

$x_2 = \dots\dots\dots$

$x_3 = \dots\dots\dots$

(3)

(b) Explain the relationship between the values of x_1 , x_2 and x_3 and the equation $x^3 + 2x^2 + 4 = 0$

(2)

Q6. Show that $(x + 1)(x + 2)(x + 3)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a , b , c and d are positive integers.

(3)

Q7. Solve $2x^2 + 4x - 5 = 0$ Give your solutions correct to 2 decimal places.

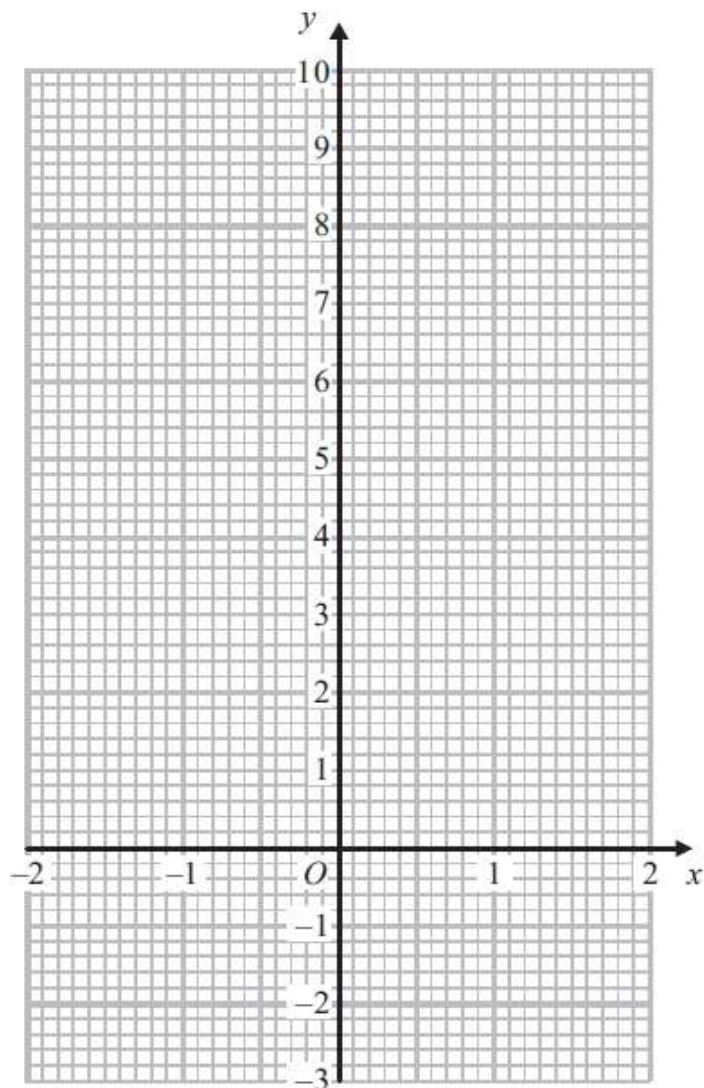
(3)

Q8. (a) Complete the table of values for $y = 2x^2 - 1$

x	-2	-1	0	1	2
y	7			1	

(2)

(b) On the grid below, draw the graph of $y = 2x^2 - 1$ for values of x from $x = -2$ to $x = 2$



(2)

(c) Use your graph to write down estimates of the solutions of the equation $2x^2 - 1 = 0$

(2)

Q9. Alison is using the quadratic formula to solve a quadratic equation. She substitutes values into the formula and correctly gets

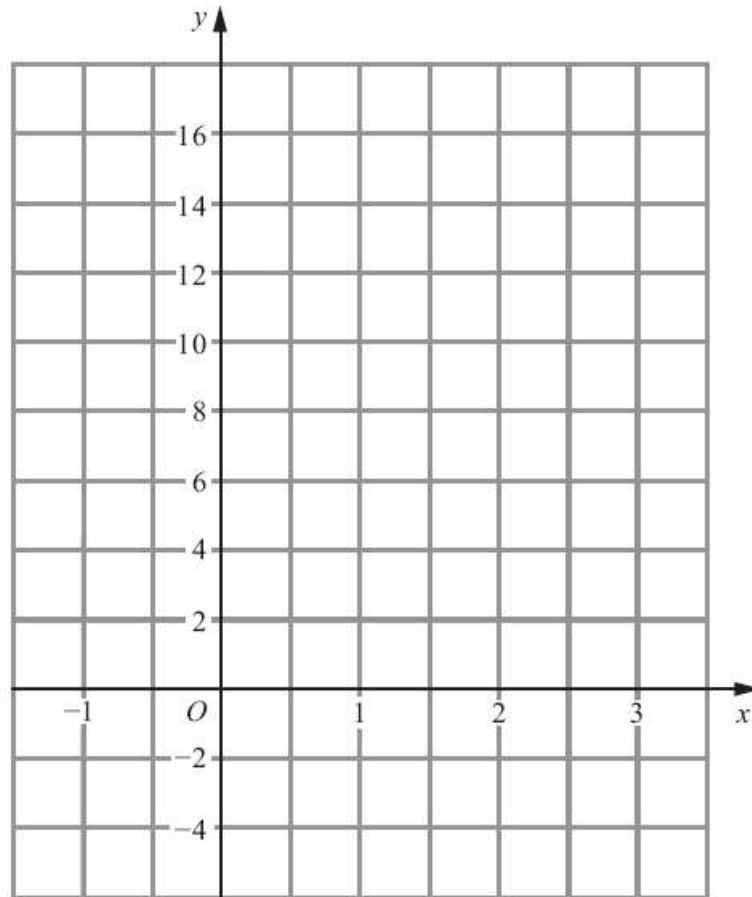
$$x = \frac{-7 \pm \sqrt{49 - 32}}{4}$$

Work out the quadratic equation that Alison is solving.

Give your answer in the form $ax^2 + bx + c = 0$, where a , b and c are integers.

(3)

Q10. (a) On the grid, draw the graph of $y = 4x + 2$ from $x = -1$ to $x = 3$



(3)

(b) (i) Write down the equation of a straight line that is parallel to $y = 4x + 2$

(ii) Write down the gradient of a straight line that is perpendicular to $y = 4x + 2$

(2)

Q11. The points $A(6, 1)$ and $B(-2, 5)$ are on the line with equation $y = -\frac{1}{2}x + 4$

M is the midpoint of AB .

Find an equation of the line through M that is perpendicular to $y = -\frac{1}{2}x + 4$

(4)

Q12. A is the point with coordinates $(1, 3)$

B is the point with coordinates $(4, -1)$

The straight line L goes through both A and B .

Is the line with equation $2y = 3x - 4$ perpendicular to line L ?

You must show how you got your answer.

(4)

Q13. A and B are straight lines.

Line A has equation $2y = 3x + 8$

Line B goes through the points $(-1, 2)$ and $(2, 8)$

Do lines A and B intersect?

You must show all your working.

(4)

Q14. The graph of $y = f(x)$ is drawn on the grid.

(a) Write down the coordinates of the turning point of the graph.

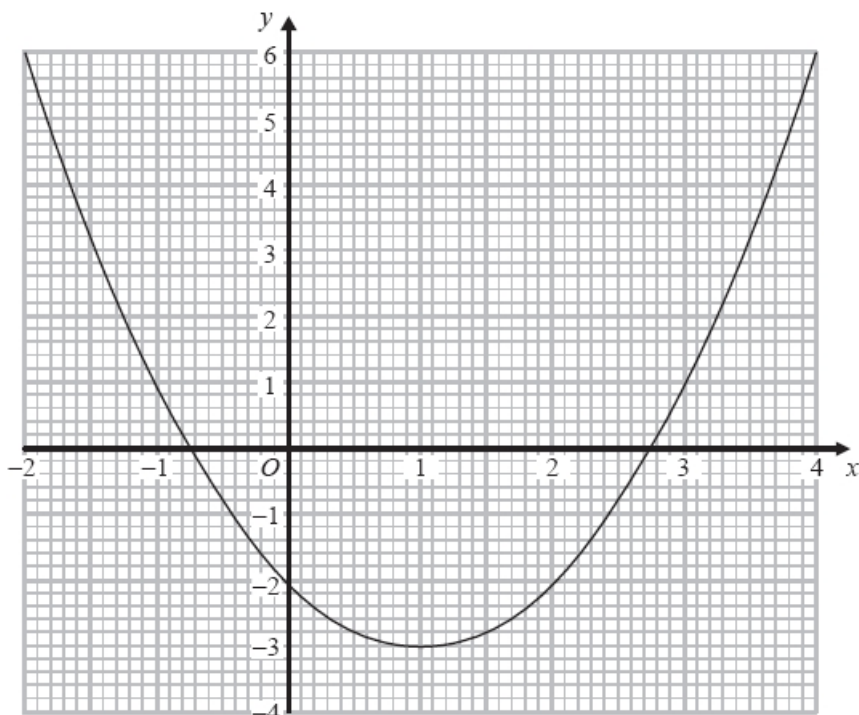
(..... ,)

(1)

(b) Write down estimates for the roots of $f(x) = 0$

.....

(1)



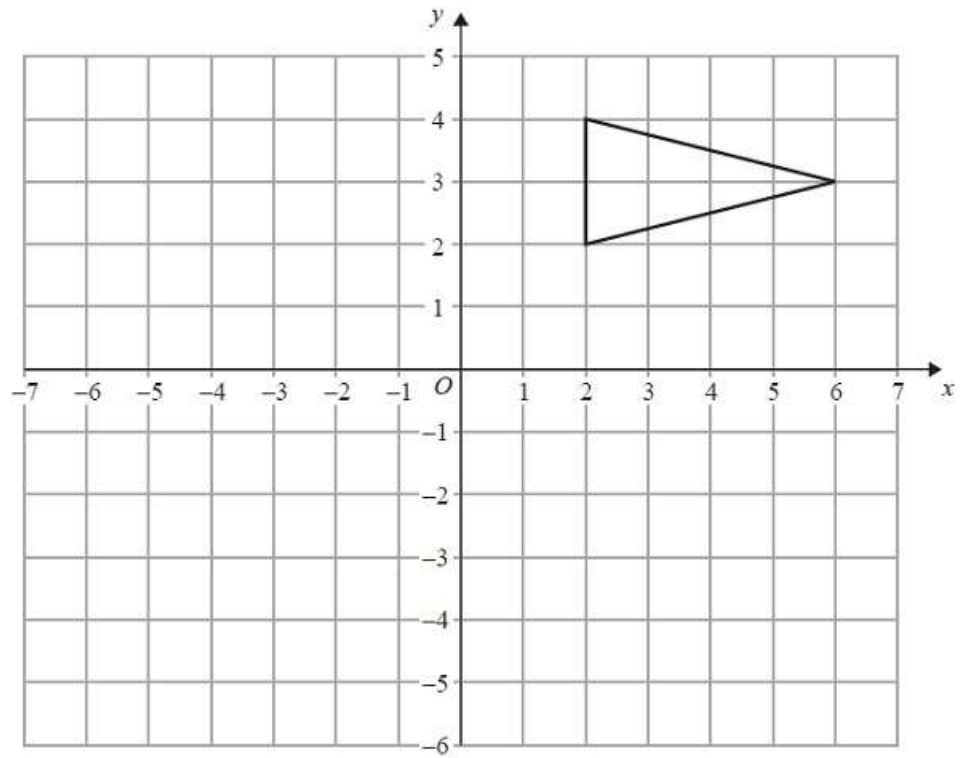
(c) Use the graph to find an estimate for $f(1.5)$

.....

(1)

Q15.

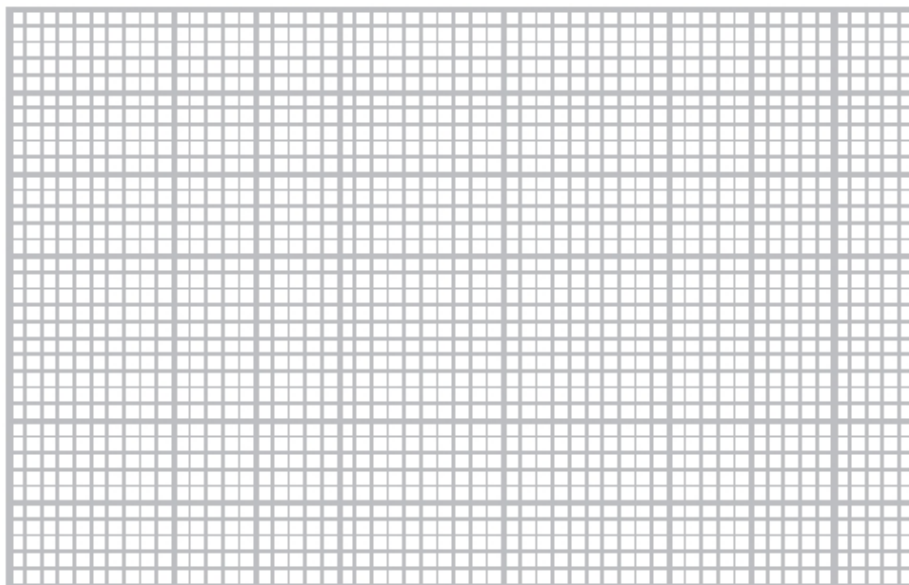
On the grid, enlarge the triangle by scale factor $\frac{1}{2}$, centre $(0, -2)$.



Q16. The table shows some information about the length of time some birds were on a bird table.

Time (t seconds)	Frequency
$0 < t \leq 10$	8
$10 < t \leq 20$	16
$20 < t \leq 25$	15
$25 < t \leq 30$	12
$30 < t \leq 50$	6

Draw a histogram for the information in the table.



Q17. The diagram shows a pyramid.

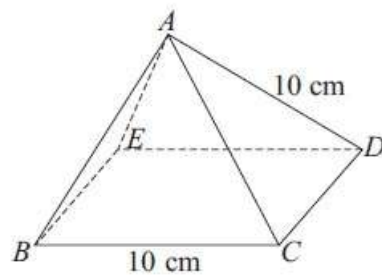


Diagram **NOT**
accurately drawn

$BCDE$ is a square with sides of length 10 cm .

The other faces of the pyramid are equilateral triangles with sides of length 10 cm .

(a) Calculate the volume of the pyramid.

Give your answer correct to 3 significant figures.

(4)

(b) Find the size of angle DAB .

(2)

Q18. The points $A(6, 1)$ and $B(-2, 5)$ are on the line with equation $y = -\frac{1}{2}x + 4$
 M is the midpoint of AB .

Find an equation of the line through M that is perpendicular to $y = -\frac{1}{2}x + 4$

(4)

Q19. L is a straight line. The gradient of L is 4 L passes through the point $(0, 2)$.

(a) Write down an equation of the straight line L .

(2)

L_1 is a straight line parallel to L . L_1 passes through the point with coordinates $(2, -6)$

(b) Find an equation of L_1 .

(3)

Q20. Write $x^2 + 6x - 7$ in the form $(x + a)^2 + b$ where a and b are integers.

(Total for question = 2 marks)

Q21. Tim plays a game. He can win the game or he can lose the game or he can draw the game.

The probability that Tim will win the game is 0.25

The probability that Tim will lose the game is x .

(a) Give an expression, in terms of x , for the probability that he will draw the game.

(2)

Tim plays the game 240 times.

(b) Work out an estimate for the number of times he will win the game.

(2)

Q22. There are three different types of sandwiches on a shelf.

There are

4 egg sandwiches,

5 cheese sandwiches

and 2 ham sandwiches.

Erin takes at random 2 of these sandwiches.

Work out the probability that she takes 2 different types of sandwiches.

(5)

Q23. The value of p is 4.3 The value of q is 0.4

Both p and q are given correct to the nearest 0.1

(a) Write down the lower bound for p .

(1)

$$r = p + \frac{1}{q}$$

- (b) Work out the upper bound for r .
You must show all your working.

(3)

Q24.

*

OAB is a triangle.
 M is the midpoint of OA .
 N is the midpoint of OB .

$$\vec{OM} = \mathbf{m}$$

$$\vec{ON} = \mathbf{n}$$

Show that AB is parallel to MN .

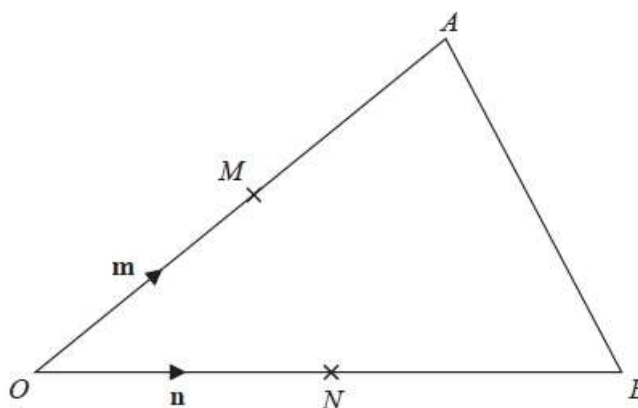


Diagram NOT
accurately drawn

(3)

Q25.

Rationalise the denominator of $\frac{(6 - \sqrt{5})(6 + \sqrt{5})}{\sqrt{31}}$

Give your answer in its simplest form.

(3)

