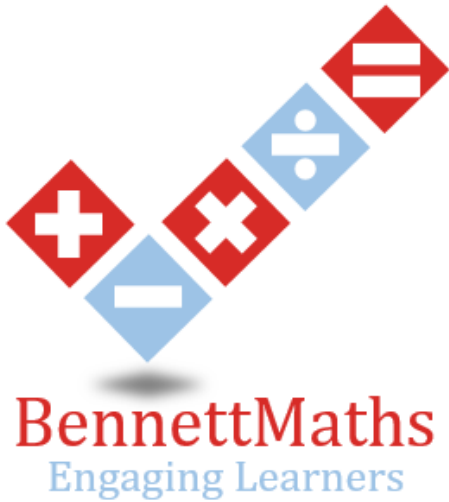


***BennettMaths will be live on TikTok the night before paper 3,
going through all the predicted papers.***

Tuesday 9th June at 8pm

Candidate surname

Other names



**Best Guess Paper –
3H
Calculator**

Within this booklet you will find my best guess at which topics might be on the third AQA Higher gcse maths paper.

There may be other topics that appear on paper 3, so please ensure that you continue to revise all topics.

The paper consists of 25 questions totalling 80 marks.

1

(a) Write down the highest common factor (HCF) of 30 and 45

[1 mark]

Answer

15

(b) Write down the lowest common multiple (LCM) of 30 and 45

[1 mark]

Answer

90

2

A number, n , is rounded to 2 significant figures.

The result is 2.3

Complete the error interval for n

[2 marks]

$$2.25 \leq n < 2.35$$

- 3** The surface area of a cube is 73.5cm^2

Work out the volume of the cube

[3 marks]

$$73.5 \div 6 = 12.25$$

$$\sqrt{12.25} = 3.5$$

Answer _____

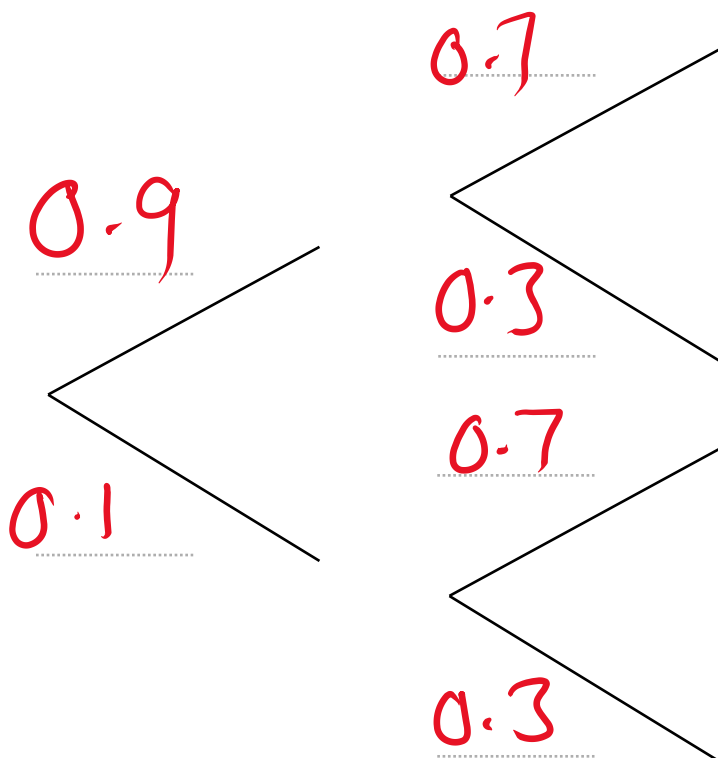
4

Margot is going to play one game of snooker and one game of pool.
The probability that Margot wins a game of snooker is 0.9.
The probability that Margot does not win a game of pool is 0.3.

Snooker

Pool

[2 marks]



(b)

Work out the probability that Margot wins at both snooker and pool.

[2 marks]

$$0.9 \times 0.7 = 0.63$$

Answer _____

5

Frankie travels 400km in 4 hours and 48 minutes.

[2 marks]

Work out his average speed, giving your answer as a decimal.

$$\frac{400}{4.8} = 83.\dot{3}$$

Answer _____

6

A linear sequence has:

2nd term = 190

5th term = 166

198 190 182 174 166

(a) Work out the nth term of the sequence

[2 marks]

$$24 \div 3 = 8$$

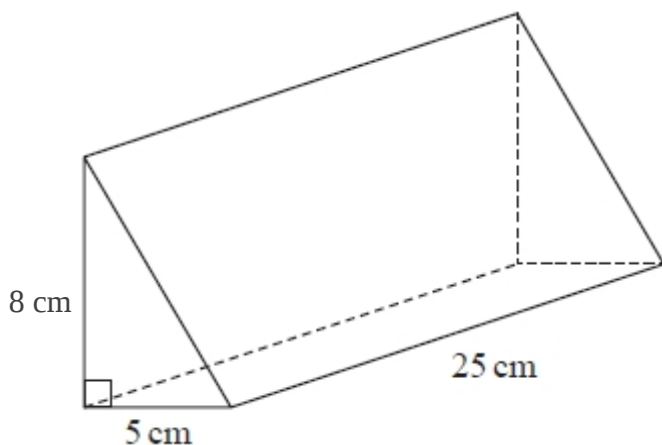
Answer $-8n + 206$

(b) Work out the value of the first term in the sequence that is negative

[2 marks]

Answer -2

7 The diagram shows a prism.



The cross section of the prism is a right-angled triangle.

The base of the triangle has length 5 cm

The prism has length 25 cm

The mass of the prism is 250g.

Work out the density of the prism.

[3 marks]

$$\frac{8 \times 5}{2} \times 25 = 500$$

$$250\text{g} : 500\text{cm}^3$$
$$0.5\text{g} : 1\text{cm}^3$$

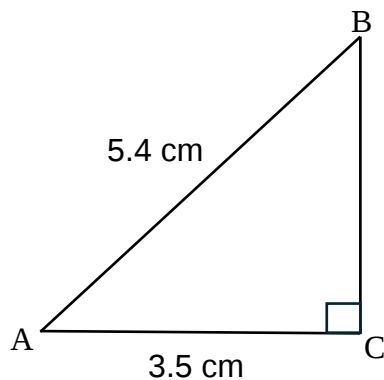
Answer 0.5g/cm^3

8

The right-angled triangle ABC has been drawn below.

AB = 5.4 cm

AC = 3.5 cm



Work out the length of BC.

Give your answer correct to 2 decimal places.

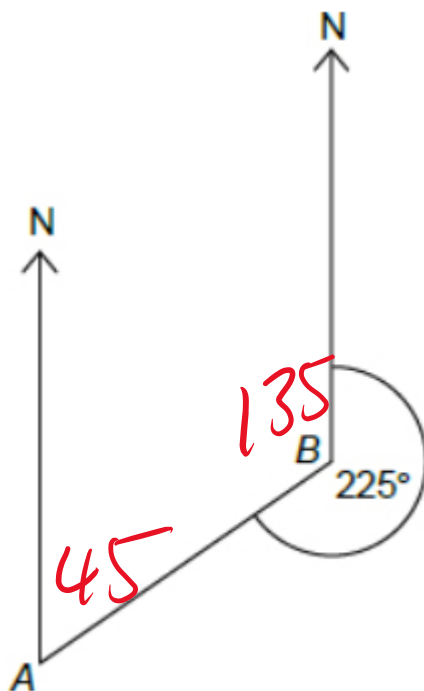
[3 marks]

$$\sqrt{5.4^2 - 3.5^2} = 4.11$$

Answer

4.11

- 9 The bearing of A from B is 225°



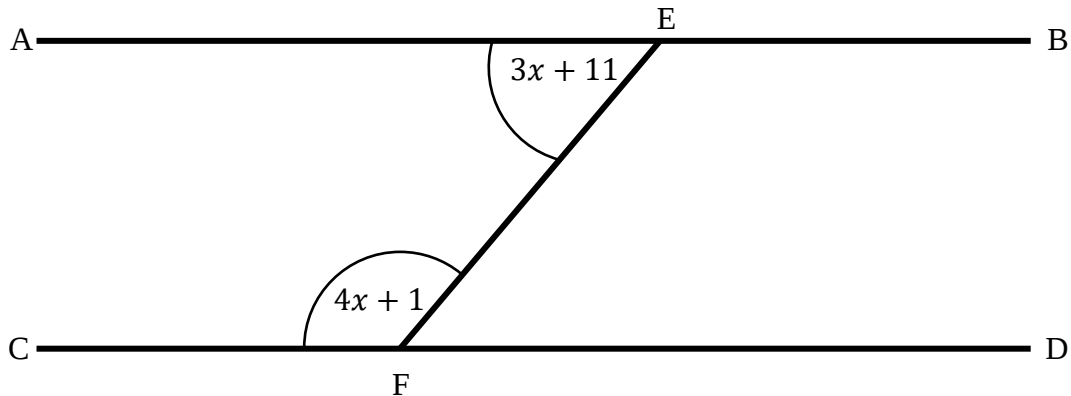
[2 marks]

Work out the bearing of B from A

Answer

045

- 10** AB and CD are a set of parallel lines



Angle AEF = $3x + 11$

Angle CFE = $4x + 1$

Work out the size of x

[3 marks]

$$7x + 12 = 180$$

$$7x = 168$$

$$x = 24$$

Answer _____

11 Solve

[3 marks]

$$5x^2 + 2x - 10 = 0$$

$$a=5 \quad b=2 \quad c=-10$$

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(5)(-10)}}{2(5)}$$

Answer $x = -1.23 \quad x = -1.63$

12 Solve algebraically

[4 marks]

$$\begin{array}{rcl} 3x + 2y & = & 9.5 \quad \times 5 \\ 7x - 5y & = & 41.5 \quad \times 2 \end{array}$$

$$\begin{array}{r|l} + 15x + 10y = 47.5 & 3(4.5) + 2y = 9.5 \\ 14x - 10y = 83 & 13.5 + 2y = 9.5 \\ \hline 29x = 130.5 & 2y = -4 \\ x = 4.5 & y = -2 \end{array}$$

Answer $x = 4.5, y = -2$

- 13** The frequency table below shows the pocket money received by 35 pupils in April. [4 marks]

Pocket Money	Frequency
$0 \leq x < 5$	7
$5 \leq x < 8$	8
$8 \leq x < 10$	16
$10 \leq x < 20$	4

35

mp
2.5
6.5
9
15

mp x f
17.5
52
144
60
273.5

The mean amount of pocket money received in March was £7.50.

By estimating the mean, determine in which month pupils received the most pocket money, on average.

March

☐

April

☒

$$273.5 \div 35 = £7.81$$

14 Show that

$$(2x + 1)(x - 3)(4x + 2) = 8x^3 - 16x^2 - 22x - 6$$

[3 marks]

$$2x^2 - 6x + 1x - 3$$

$$(2x^2 - 5x - 3)(4x + 2)$$

$$8x^3 + 4x^2 - 20x^2 - 10x - 12x - 6$$

$$8x^3 - 16x^2 - 22x - 6$$

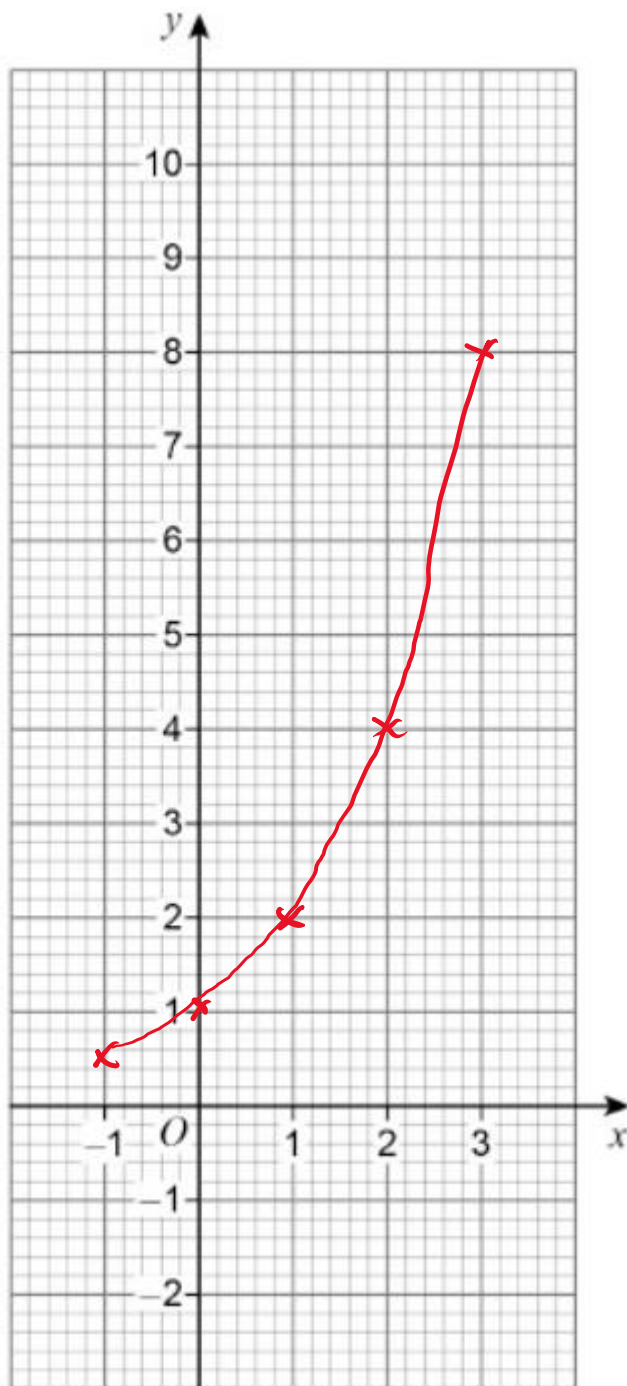
15(a) Complete the table of values of $y = 2^x$.

[2 marks]

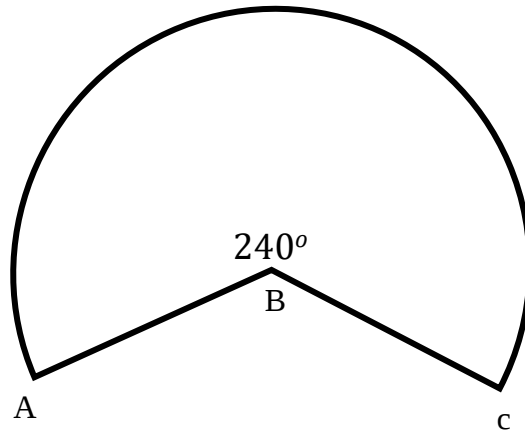
x	-1	0	1	2	3
y	0.5	1	2	4	8

(b) Draw the graph of $y = 2^x$ for values of x from -1 to 3

[2 marks]



16



The size of the reflex angle ABC is 240°

The length of arc AC is 8π

[2 marks]

Work out the area of the sector

$$\begin{array}{l|l} \frac{240}{360} \times \pi \times D = 8\pi & \frac{240}{360} \times \pi \times 6^2 \\ D = 12 & = 24\pi \\ r = 6 & = 75.4 \text{ cm}^2 \end{array}$$

Answer _____

17 A combination lock contains 4 digits using the numbers 0 to 9.

(a) If numbers can be repeated, how many different combinations are possible

[2 marks]

$$10 \times 10 \times 10 \times 10$$

Answer

10000

The combination lock requires different numbers for each digit

(b) Work out how many different combinations are possible

[2 marks]

$$10 \times 9 \times 8 \times 7$$

Answer

5040

18 Work out

$$0.4\dot{5} \times 0.\dot{7}8\dot{2}$$

Give your answer as a fraction in its simplest form
You must show your working

[4 marks]

$$\begin{array}{l|l}
 x = 0.4\dot{5} & x = 0.\dot{7}8\dot{2} \\
 \hline
 10x = 4.\dot{5} & 10x = 7.\bar{8}2\dot{7} \\
 \hline
 100x = 45.\dot{5} & 100x = 78.\bar{2}7\dot{8} \\
 \hline
 90x = 41 & 1000x = 782.\bar{7}8\dot{2} \\
 \hline
 x = \frac{41}{90} & 999x = 782 \\
 & x = \frac{782}{999}
 \end{array}$$

$$\frac{41}{90} \times \frac{782}{999} = \frac{32062}{89910}$$

Answer $\frac{16031}{44955}$

- 19** Show that $2^{20} - 1$ is the product of two consecutive odd numbers

[2 marks]

$$(2^{10} + 1)(2^{10} - 1)$$

2^{10} is even

$2^{10} - 1$ and $2^{10} + 1$ are odd

Answer _____

- 20** A circle **C** has a centre of (0,0) and a diameter of 24 $r = 12$

Write down the equation of the circle

[1 mark]

Answer $x^2 + y^2 = 144$

- 21** x is an integer such that $3x - 2 \leq 10$ and $\frac{6x}{x^2+5} > 1$ **[5 marks]**

$$3x \leq 12$$

$$x \leq 4$$

$$6x > x^2 + 5$$

$$0 > x^2 - 6x + 5$$

$$0 > (x-5)(x-1)$$

$$x=5 \quad x=1$$

$$1 < x < 5$$

Answer 2, 3, 4

22 The frequency table shows the time taken to complete a journey

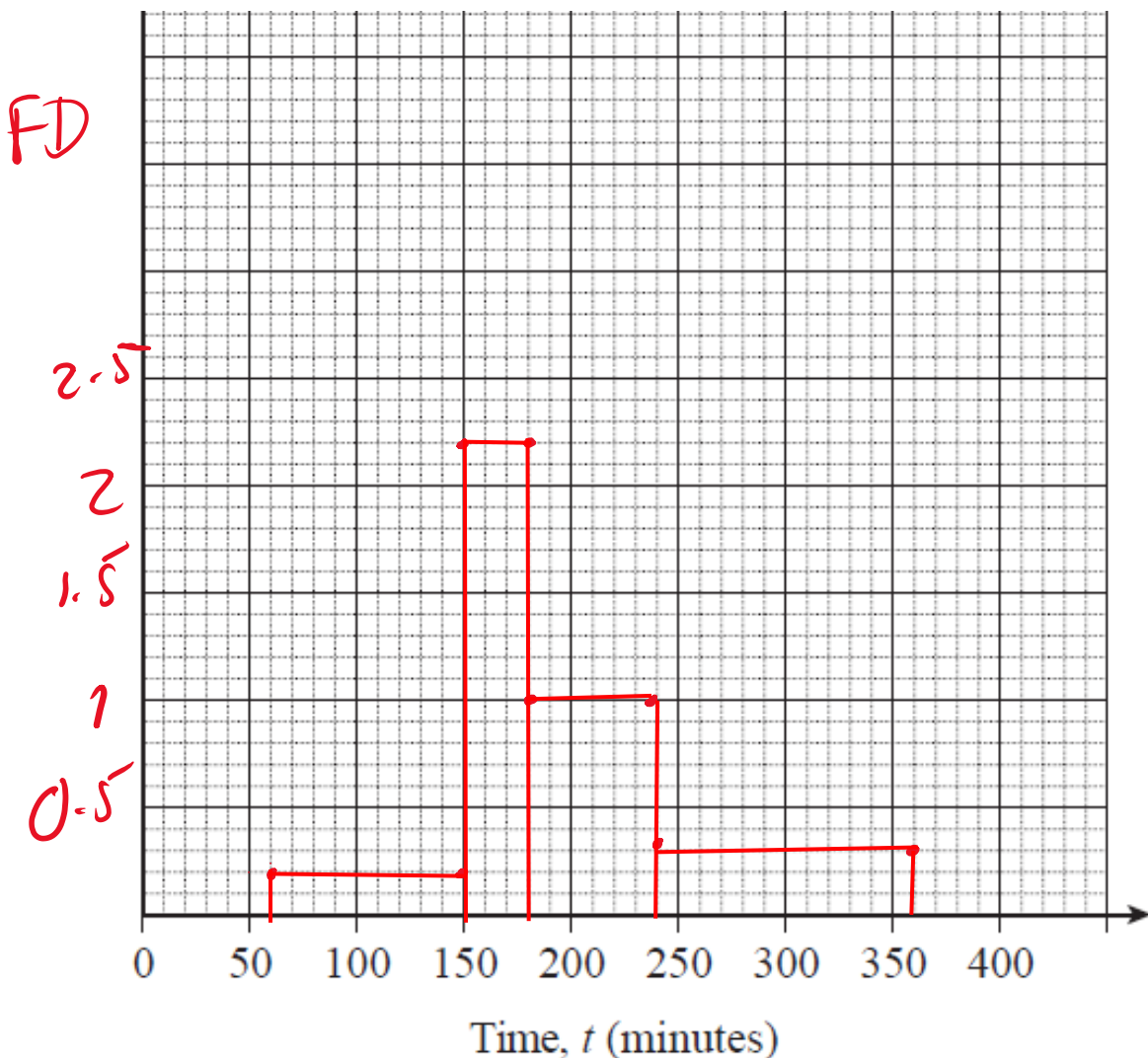
Time, t (minutes)	Frequency
$60 < t \leq 150$	18
$150 < t \leq 180$	66
$180 < t \leq 240$	60
$240 < t \leq 360$	36

CW
90
30
60
120

F.D
0.2
2.2
1
0.3

Construct a histogram to represent this information

[3 marks]



23

$$f(x) = 3x^2 - 2$$

$$g(x) = 2x + 3$$

(a)

Find $fg(2)$

[2 marks]

$$2(2) + 3 = 7$$

$$3(7)^2 - 2 = 145$$

Answer _____

(b)

Find $f^{-1}(x)$

[2 marks]

$$y = 3x^2 - 2$$

$$x = \sqrt{\frac{y+2}{3}}$$

$$x + 2 = 3y^2$$

$$\frac{x+2}{3} = y^2$$

Answer _____

$$f^{-1}(x) = \sqrt{\frac{x+2}{3}}$$

24

Solve

$$\frac{2x+4}{5x-1} + \frac{x+3}{4x} - 1 = 4$$

Give your answers correct to 3 significant figures

[5 marks]

$$\underline{8x^2 + 16x + 5x^2 + 14x - 3}$$

$$20x^2 - 4x$$

$$= \frac{13x^2 + 30x - 3}{20x^2 - 4x} - \frac{20x^2 - 4x}{20x^2 - 4x}$$

$$\frac{-7x^2 + 34x - 3}{20x^2 - 4x} = 4$$

$$-7x^2 + 34x - 3 = 80x^2 - 16x$$

$$0 = 87x^2 - 50x + 3$$

$$\frac{50 \pm \sqrt{(-50)^2 - 4(87)(3)}}{2 \times 87}$$

$$x = 0.507$$

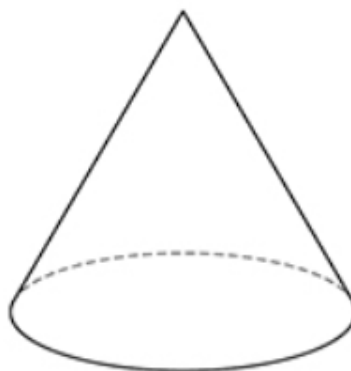
$$x = 0.068$$

25 Here are two similar cones

Cone A



Cone B



The ratio of the volume of cone a : volume of cone b is 27: 125

The surface area of cone A is 40.5cm².

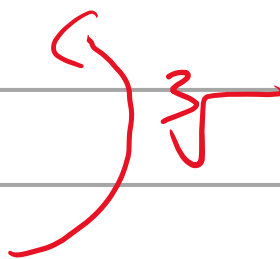
Work out the surface area of cone B

[3 marks]

$$L \quad 3:5$$

$$A \quad 9:25$$

$$V \quad 27:125$$

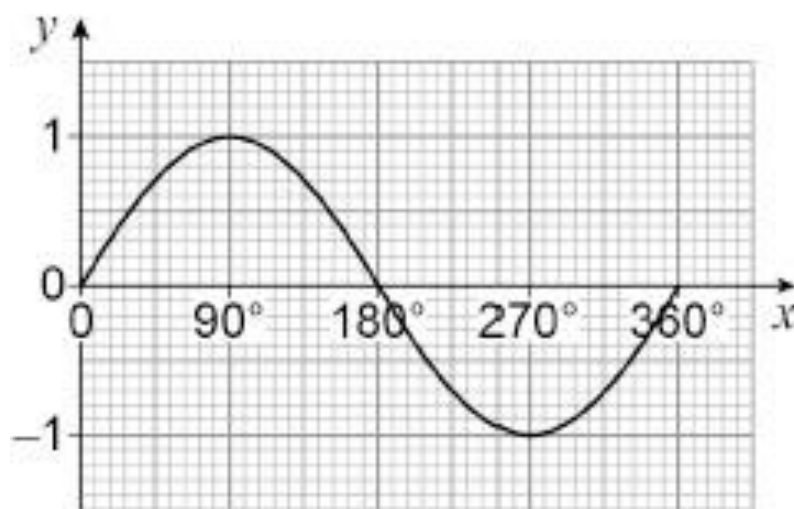


$$\begin{array}{ccc} \times 4.5 & 9:25 & \times 4.5 \\ \downarrow & & \downarrow \\ & 40.5:112.5 & \end{array}$$

Answer

112.5

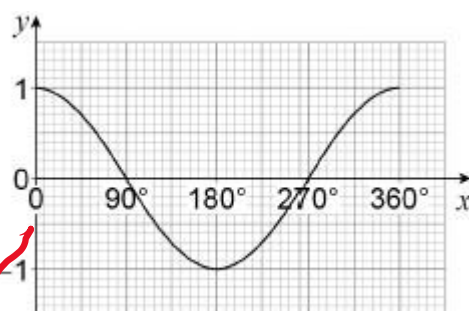
26 Here is the graph of $y = \sin(x)$



Match each function to its graph, for $0 \leq x \leq 360$

[2 marks]

$$y = -\sin(x)$$



$$y = \sin(x + 90)$$

