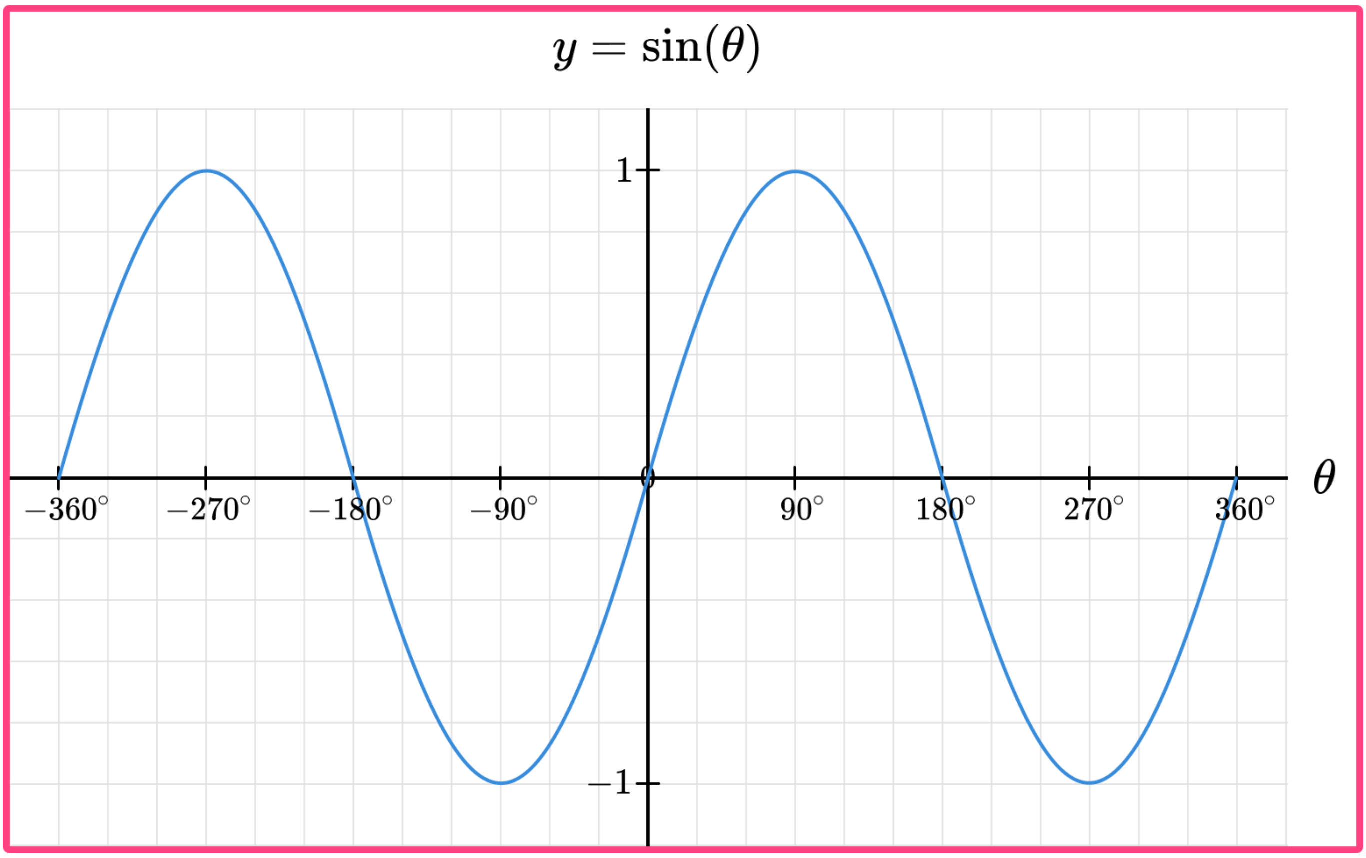
Sine, Cosine, and Tangent Graphs - Worksheet

Skill

Group A - Interpreting the graph of $y = \sin(\theta)$

Use the graph of $y = \sin(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy.



1) $\theta = 90°$

2) $\theta = 270°$

3) $\theta = 30°$

4) $\theta = 150°$

5) $\theta = -225°$

6) $y = -1$
$0 \leq \theta \leq 360°$

7) $y = 0.6$
$-180 \leq \theta \leq 180°$

8) $y = 0$
$-180 \leq \theta \leq 180°$

9) $y = -0.2$
$-180 \leq \theta \leq 180°$

10) $y = 0.8$
$-360 \leq \theta \leq 360°$

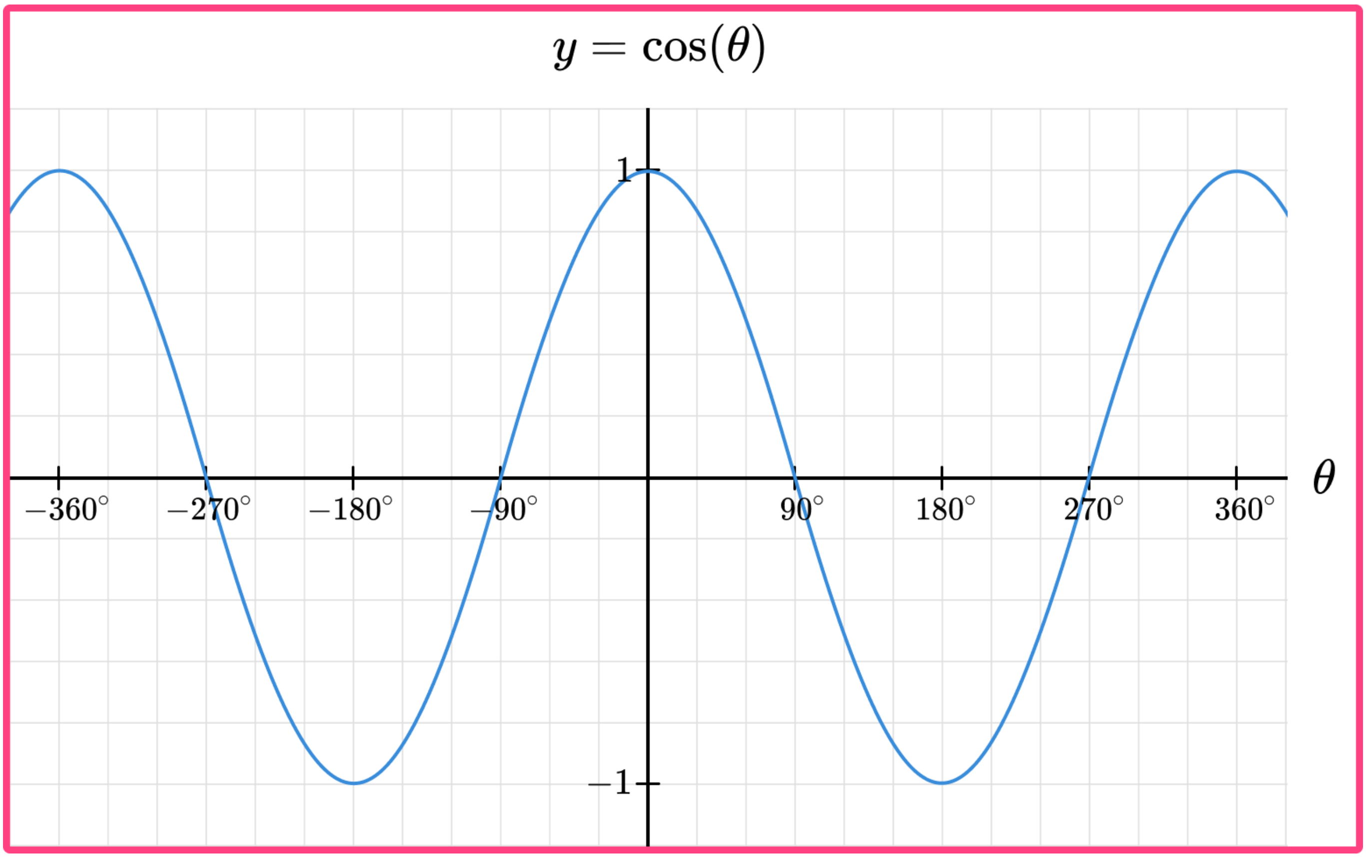
11) $y = 0.5$
$-360 \leq \theta \leq 360°$

12) $y = -0.9$
$-360 \leq \theta \leq 360°$

Sine, Cosine, and Tangent Graphs - Worksheet

Group B - Interpreting the graph of $y = \cos(\theta)$

Use the graph of $y = \cos(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy.



1) $\theta = 180°$

2) $\theta = -90°$

3) $\theta = 60°$

4) $\theta = 225°$

5) $\theta = -285°$

6) $y = 1$
$0 \leq \theta \leq 360°$

7) $y = 0.4$
$-180 \leq \theta \leq 180°$

8) $y = -1$
$-180 \leq \theta \leq 180°$

9) $y = -0.8$
$-180 \leq \theta \leq 180°$

10) $y = 0.2$
$-360 \leq \theta \leq 360°$

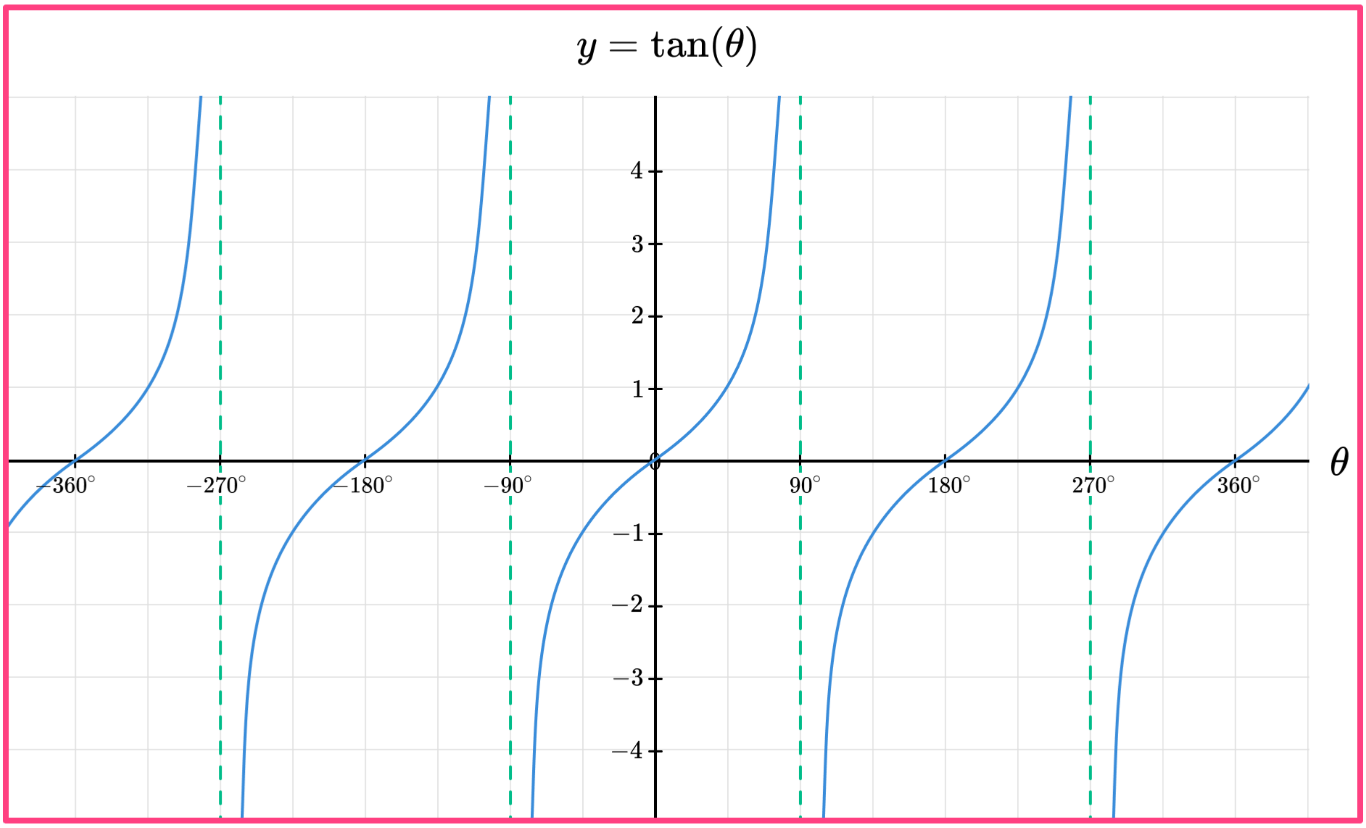
11) $y = 0.5$
$-360 \leq \theta \leq 360°$

12) $y = -0.3$
$-360 \leq \theta \leq 360°$

Sine, Cosine, and Tangent Graphs - Worksheet

Group C - Interpreting the graph of $y = \tan(\theta)$

Use the graph of $y = \tan(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy.



1) $\theta = 45°$

2) $\theta = 135°$

3) $\theta = 0°$

4) $\theta = 240°$

5) $\theta = 90°$

6) $y = 0$
$0 \leq \theta \leq 360°$

7) $y = 1.75$
$-180 \leq \theta \leq 180°$

8) $y = -2$
$-180 \leq \theta \leq 180°$

9) $y = 0.75$
$-180 \leq \theta \leq 180°$

10) $y = 0.25$
$-360 \leq \theta \leq 360°$

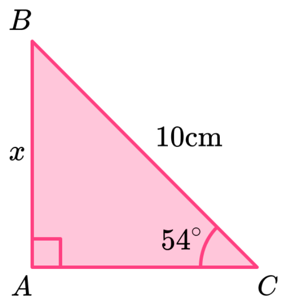
11) $y = 2.7$
$-360 \leq \theta \leq 360°$

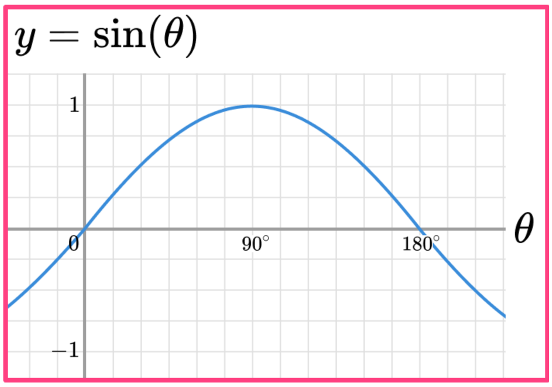
12) $y = 0.9$
$-360 \leq \theta \leq 360°$

Sine, Cosine, and Tangent Graphs - Worksheet

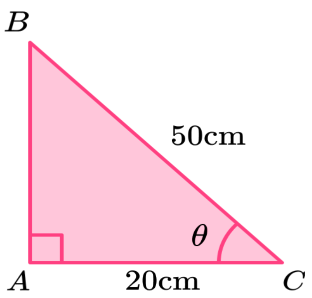
Applied

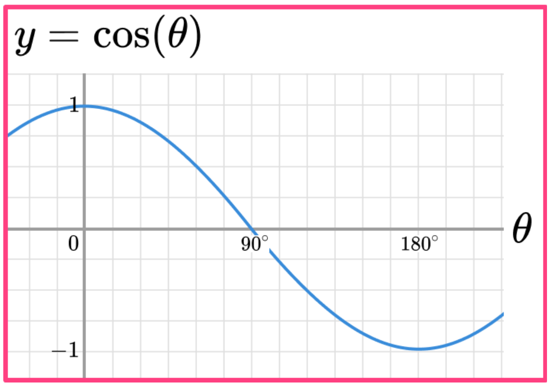
1) Using the graph of $y = \sin(\theta)$, estimate the length of the missing side of the triangle ABC.



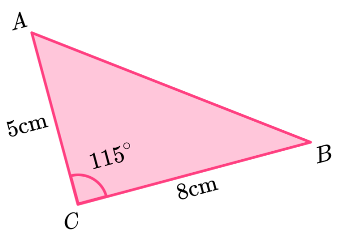


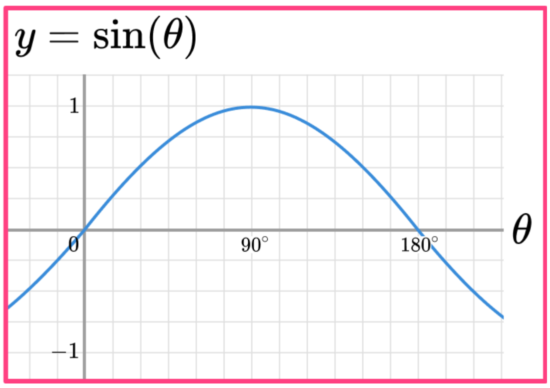
2) Using the graph of $y = \cos(\theta)$, estimate the size of angle θ in the triangle ABC.





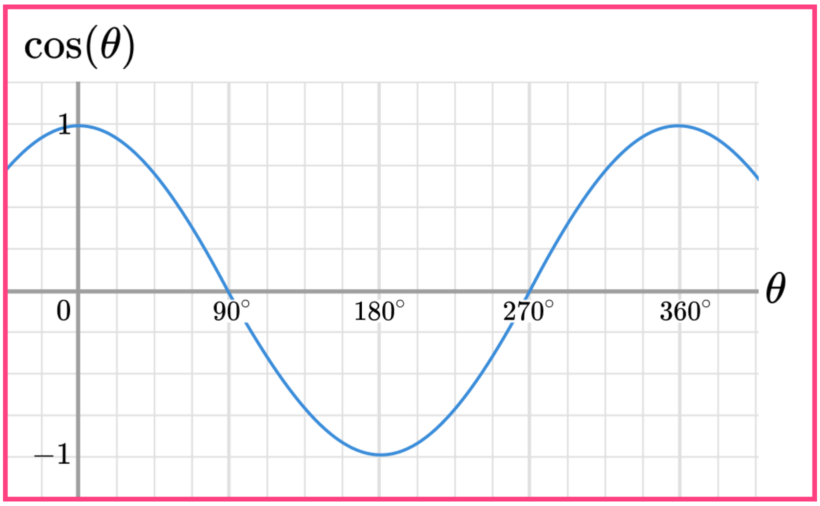
3) Using the graph of $y = \sin(\theta)$, estimate the area of the triangle ABC.





Sine, Cosine, and Tangent Graphs - Exam Questions

1) Here is a sketch of the graph of $y = \cos(\theta)$ for values of θ from $0°$ to $360°$.



(a) $\cos(\theta) = \cos(315)$

Work out the value of θ when $0 \leq \theta \leq 180°$.

....

(2)

(b) $\cos(\theta) = \cos(315)$

Work out the value of x when $540 \leq \theta \leq 720°$.

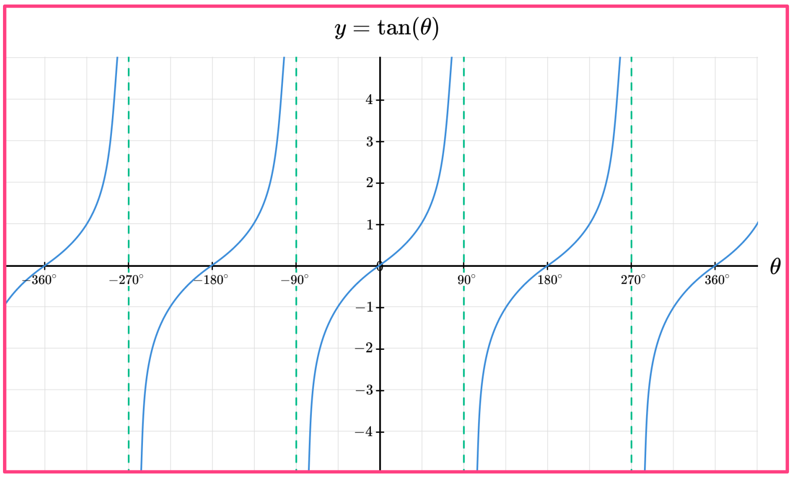
....

(2)

(4 marks)

Sine, Cosine, and Tangent Graphs - Exam Questions

2) Here is a sketch of the graph of $y = \tan(\theta)$ for values of θ from $-360°$ to $360°$.



(a) Using the graph of $\tan(\theta)$, write down the two solutions to the equation $\tan(\theta) = 2.5$ for $-360 \leq \theta \leq 0$.

....

(3)

(b) Estimate the value of θ for $-90 \leq \theta \leq 0$ when $\tan(\theta) = -3$

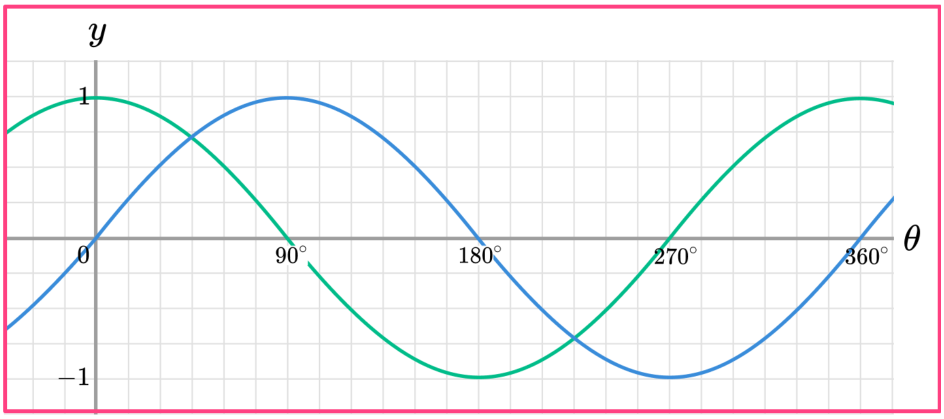
....

(2)

(5 marks)

Sine, Cosine, and Tangent Graphs - Exam Questions

3) Here are the graphs of $y = \cos(\theta)$ and $y = \sin(\theta)$ for values of θ from $0°$ to $360°$.



(a) Write the solutions of θ when $\sin(\theta) = \cos(\theta)$ for $0 \leq \theta \leq 360°$.

....

(2)

(b) Kim says:

The graphs of the sine, cosine and tangent functions all intersect at the same point for $0 \leq \theta \leq 90°$

By using exact trigonometric values, show that Kim is **not** correct.

....

(3)

(5 marks)

Sine, Cosine, and Tangent Graph - Answers

	Question	Answer
	Skill Questions	
Group A	Use the graph of $y = \sin(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy. **1)** $\theta = 90°$ **2)** $\theta = 270°$ **3)** $\theta = 30°$ **4)** $\theta = 150°$ **5)** $\theta = -225°$ **6)** $y = -1,\ 0 \leq \theta \leq 360°$ **7)** $y = 0.6,\ -180 \leq \theta \leq 180°$ **8)** $y = 0, -180 \leq \theta \leq 180°$ **9)** $y = -0.2, -180 \leq \theta \leq 180°$ **10)** $y = 0.8, -360 \leq \theta \leq 360°$ **11)** $y = 0.5, -360 \leq \theta \leq 360°$ **12)** $y = -0.9, -360 \leq \theta \leq 360°$	**1)** $y = 1$ **2)** $y = -1$ **3)** $y = 0.5$ **4)** $y = 0.5$ **5)** $y = 0.7$ **6)** $\theta = 270°$ **7)** $\theta = 37°,\ 143°$ **8)** $\theta = -180°,\ 0°,\ 180°$ **9)** $\theta = -168°,\ -12°$ **10)** $\theta = -307°,\ -233°,\ 53°,\ 127°$ **11)** $\theta = -330°,\ -210°,\ 30°,\ 150°$ **12)** $\theta = -116°,\ -64°,\ 244°,\ 296°$
Group B	Use the graph of $y = \cos(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy. **1)** $\theta = 180°$ **2)** $\theta = -90°$ **3)** $\theta = 60°$ **4)** $\theta = 225°$ **5)** $\theta = -285°$ **6)** $y = 1, 0° \leq \theta \leq 360°$ **7)** $y = 0.4, -180 \leq \theta \leq 180°$ **8)** $y = -1, -180 \leq \theta \leq 180°$ **9)** $y = -0.8, -180 \leq \theta \leq 180°$ **10)** $y = 0.2, -360 \leq \theta \leq 360°$ **11)** $y = 0.5, -360 \leq \theta \leq 360°$ **12)** $y = -0.3, -360 \leq \theta \leq 360°$	**1)** $y = -1$ **2)** $y = 0$ **3)** $y = 0.5$ **4)** $y = -0.7$ **5)** $y = 0.26$ **6)** $\theta = 0°, 360°$ **7)** $\theta = -66°, 66°$ **8)** $\theta = -180°, 180°$ **9)** $\theta = -143°, 143°$ **10)** $\theta = -282°,\ -78°, 282°,\ 78°$ **11)** $\theta = -300°, -60°,\ 60°,\ 300°$ **12)** $\theta = -253°,\ -107°,\ 107°,\ 253°$

THIRD SPACE LEARNING

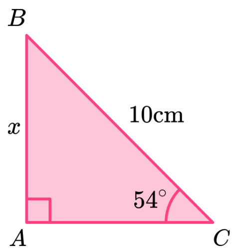
Sine, Cosine, and Tangent Graph - Answers

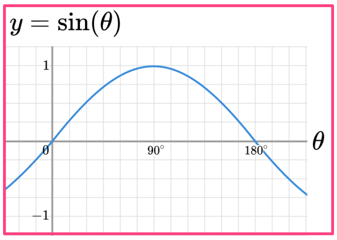
Group C	Use the graph of $y = \tan(\theta)$ for $-360 \leq \theta \leq 360°$ to estimate the values of y and θ to a suitable degree of accuracy.	
	1) $\theta = 45°$	**1)** $y = -1$
	2) $\theta = 135°$	**2)** $y = 0$
	3) $\theta = 0°$	**3)** $y = 0.5$
	4) $\theta = 240°$	**4)** $y = 1.7$
	5) $\theta = 90°$	**5)** undefined
	6) $y = 0, 0 \leq \theta \leq 360°$	**6)** $\theta = 0°, 180°, 360°$
	7) $y = 1.75, -180 \leq \theta \leq 180°$	**7)** $\theta = -120°, 60°$
	8) $y = -2, -180 \leq \theta \leq 180°$	**8)** $\theta = -63°, 117°$
	9) $y = 0.75, -180 \leq \theta \leq 180°$	**9)** $\theta = -143°, 37°$
	10) $y = 0.25, -360 \leq \theta \leq 360°$	**10)** $\theta = -346°, -166°, 14°, 194°$
	11) $y = 2.7, -360 \leq \theta \leq 360°$	**11)** $\theta = -290°, -110°, 70°, 250°$
	12) $y = 0.9, -360 \leq \theta \leq 360°$	**12)** $\theta = -318°, -138°, 42°, 222°$

Sine, Cosine, and Tangent Graph - Answers

<table>
<tr><th></th><th>Question</th><th>Answer</th></tr>
<tr><td></td><td>Applied Questions</td><td></td></tr>
<tr><td>1)</td><td>

Using the graph of $y = \sin(\theta)$, estimate the length of the missing side of the triangle ABC.





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$\sin(54) \approx 0.8$

$x = 10\sin(54) = 8cm$

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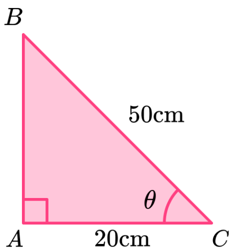
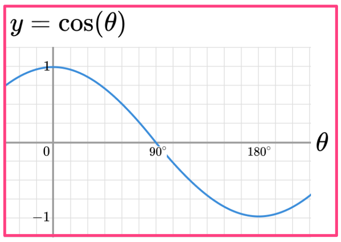
<tr><td>2)</td><td>

Using the graph of $y = \cos(\theta)$, estimate the size of angle θ in the triangle ABC.





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$\cos(\theta) = 0.4$ so $\theta \approx 80°$

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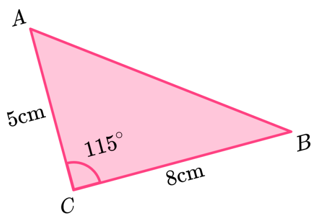
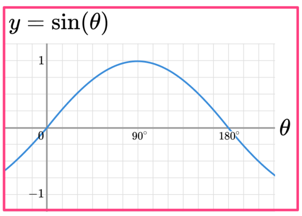
<tr><td>3)</td><td>

Using the graph of $y = \sin(\theta)$, estimate the area of the triangle ABC.





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$A = \frac{1}{2}ab\sin(C)$

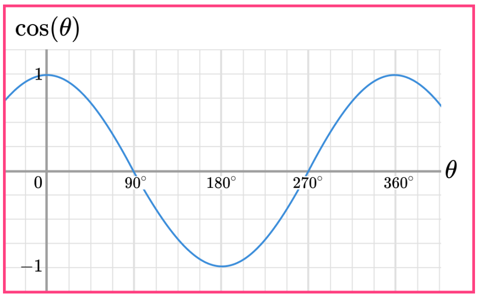
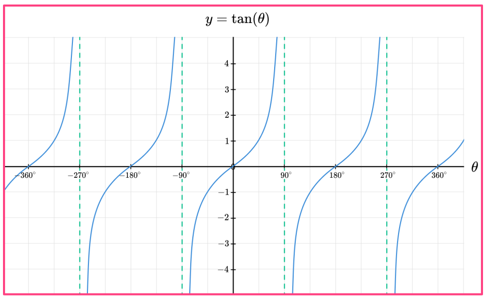
$A = \frac{1}{2} \times 8 \times 5 \times \sin(115)$

$A = 20 \times 0.9$

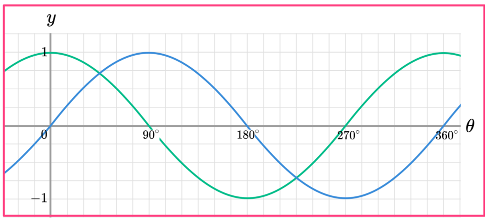
$A = 18cm^2$

</td></tr>
</table>

Sine, Cosine, and Tangent Graph - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Here is a sketch of the graph of $y = \cos(\theta)$ for values of θ from 0 to 360°. 		
(a)	$\cos(\theta) = \cos(315)$ Work out the value of θ when $0 \leq \theta \leq 180°$.	**(a)** Vertical line drawn at $\cos(315) \approx 0.7$. $\theta = 45°$	**(1)** **(1)**
(b)	$\cos(\theta) = \cos(315)$ Work out the value of θ when $540 \leq \theta \leq 720°$.	**(b)** $315° + 360°$ $\theta = 675°$	**(1)** **(1)**
2)	Here is a sketch of the graph of $y = \tan(\theta)$ for values of θ from $-360°$ to 360°. 		
(a)	Using the graph of $\tan(\theta)$, write down the two solutions to the equation $\tan(x) = 2.5$ for $-360 \leq x \leq 0$.	**(a)** Horizontal line drawn at $\tan(\theta) = 2.5$. $[-115, -105]$ (exact value$= -111°$) $[-295, -285]$ (exact value$= -292°$)	**(1)** **(1)** **(1)**
(b)	Estimate the value of θ for $-90 \leq \theta \leq 0$ when $\tan(\theta) = -3$.	**(b)** When $\tan(\theta) = 3$, $\theta = 72°$ $[65°, 80°]$ $\theta = -72°$ $[-80°, -65°]$	**(1)** **(1)**

Sine, Cosine, and Tangent Graph - Mark Scheme

3)	Here are the graphs of $y = \cos(\theta)$ and $y = \sin(\theta)$. 		
(a)	Write the solutions of θ when $\sin(\theta) = \cos(\theta)$ for $0 \leq \theta \leq 360°$.	**(a)** $\theta = 45°$ $\theta = 215°$	**(1)** **(1)**
(b)	Kim says "the graphs of the sine, cosine and tangent functions all intersect at the same point for $0 \leq \theta \leq 90°$". By using exact trigonometric values, show that Kim is **not** correct.	**(b)** $\sin(45) = \cos(45) = \frac{\sqrt{2}}{2}$ $\tan(45) = 1$ $\tan(45) \neq \frac{\sqrt{2}}{2}$ so not equal to $\sin(45)$ or $\cos(45)$ which is the only point of intersection of $\sin(\theta)$ and $\cos(\theta)$ for $0° \leq \theta \leq 90°$ **oe**	**(1)** **(1)** **(1)**