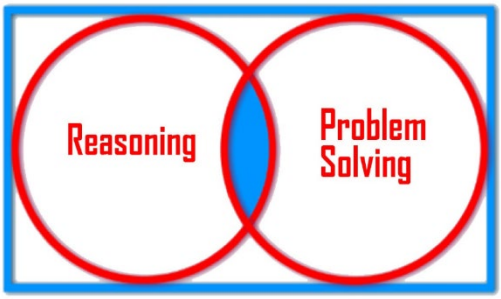

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Year 2 (A-Level)

Trigonometry – Set 1A
(Radians measure, Functions and Graphs)

The marks shown are for guidance purposes only

When not simplified, round all decimals to 4 decimal places

Small Angle formula

$$\sin\theta \approx \theta$$

$$\cos\theta \approx 1 - \frac{\theta^2}{2}$$

$$\tan\theta \approx \theta$$

Where θ is small and measured in radians

Identities

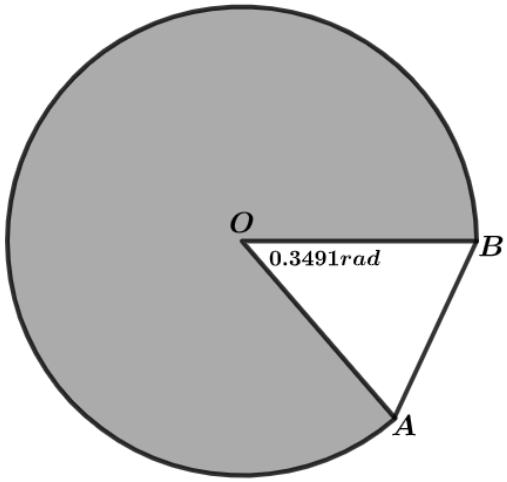
$$\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$$

$$\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A\tan B} \quad \left(A \pm B \neq \left(k + \frac{1}{2}\right)\pi\right)$$

1	Given that $\theta = 60°$, find the value of θ in radians. Hence solve the equation $2\cos\theta = 5\sin\theta$ for $0 \leq \theta \leq 2\pi$ **[3mark]**

2 In the diagram below, angle AOB is 0.3491rads. AB is a straight line.



Given that the area of the shaded sector is 249.233 square units, calculate the perimeter of the shape to 4 decimal places **[5marks]**

3 Given that the angle x rad is small

a) Show that $\frac{1-\cos 3x}{\sin x \tan x} \approx \frac{9}{2}$ **[5marks]**

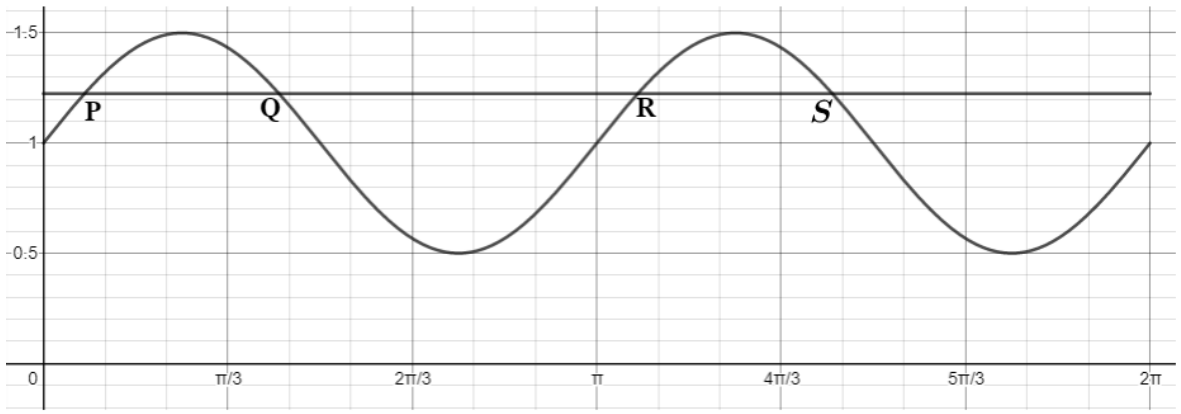
b) Find an approximate value for $\sin x \operatorname{cosec} \frac{1}{2}x$ **[2marks]**

4 Given that $\tan x = \frac{\sqrt{5}}{6}$, Find the exact values of:

a) $\sec x$ and $\operatorname{cosec} x$ **[3marks]**

b) Hence show that $\tan x + \sec x < \operatorname{cosec} x + \sec x$ **[2marks]**

5 Part of the graph of $y = \mathrm{f}(x)$ is shown below
where $\mathrm{f}(x) = a\sin bx + c$



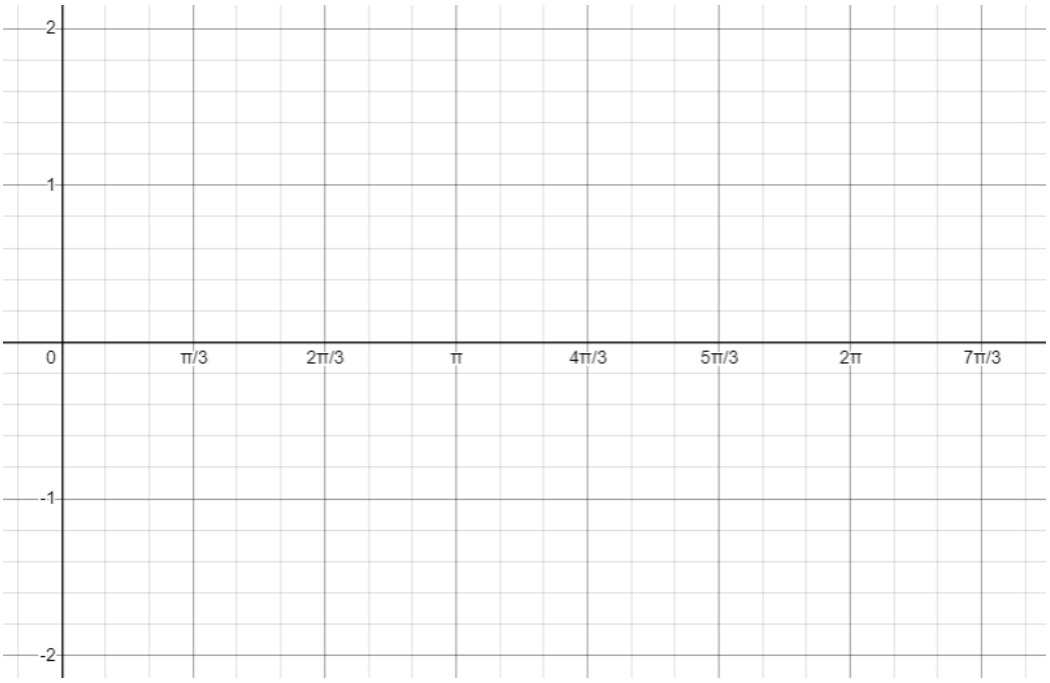
a) Determine the values of a, b and c **[3marks]**

On the same grid, part of the graph of $y = \sqrt{\frac{3}{2}}$ is also drawn.

The two graphs intersect at the points P, Q, R and S

b) Determine the coordinates of P, Q, R and S **[4marks]**

6 a) Sketch the graph of $y = -\sin x$ on the grid below for $0 \leq x \leq 2\pi$ **[1mark]**



b) On the same grid sketch the graph of $y = \cos\left(x + \frac{\pi}{3}\right)$ **[2marks]**

c) Use your graph to determine the number of solutions to the equation $-\sin x = \cos\left(x + \frac{\pi}{3}\right)$ in the stated interval and determine these coordinates **[5marks]**