

TRIGONOMETRY (Q 4 & 5, PAPER 2)

2001

4 (a) The length of an arc of a circle is 10 cm. The radius of the circle is 4 cm. The measure of the angle at the centre of the circle subtended by the arc is θ .

(i) Find θ in radians.

(ii) Find θ in degrees, correct to the nearest degree.

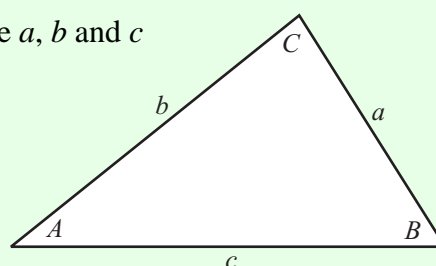
4 (b) (i) Write $\cos 2x$ in terms of $\sin x$.

(ii) Hence, find all the solutions of the equation $\cos 2x - \sin x = 1$ in the domain $0^\circ \leq x \leq 360^\circ$.

4 (c) A triangle has sides a , b and c . The angles opposite a , b and c are A , B and C , respectively.

(i) Prove that $a^2 = b^2 + c^2 - 2bc \cos A$.

(ii) Show that $c(b \cos A - a \cos B) = b^2 - a^2$.



5 (a) Evaluate $\lim_{\theta \rightarrow 0} \frac{\sin 7\theta}{\sin 2\theta}$.

5 (b) xyz is a triangle where $|xy| = 8$ cm and $|yz| = 6$ cm. Given that the area of triangle xyz is 12 cm², find

(i) the two possible values of $|\angle xyz|$

(ii) the two possible values of $|xz|$, correct to one decimal place.

5 (c) A is an obtuse angle such that $\sin\left(A + \frac{\pi}{6}\right) + \sin\left(A - \frac{\pi}{6}\right) = \frac{4\sqrt{3}}{5}$.

(i) Find $\sin A$ and $\tan A$.

(ii) Given that $\tan(A + B) = \frac{1}{2}$, find $\tan B$ and express your answer in the form $\frac{p}{q}$ where $p, q \in \mathbf{Z}$ and $q \neq 0$.

ANSWERS

4 (a) (i) 2.5 rad (ii) 143°

4 (b) (i) $1 - 2 \sin^2 x$ (ii) $0^\circ, 180^\circ, 210^\circ, 330^\circ, 360^\circ$

5 (a) $\frac{7}{2}$

5 (b) (i) $30^\circ, 150^\circ$ (ii) $4.1 \text{ cm}, 13.5 \text{ cm}$

5 (c) (i) $\frac{4}{5}, -\frac{4}{3}$ (ii) $\frac{11}{2}$