TRIGONOMETRY (Q 4 & 5, PAPER 2)

1998

4 (a) Find the values of θ for which $\cos\theta = \frac{\sqrt{3}}{2}$, where $0^\circ \leq \theta \leq 360^\circ$.

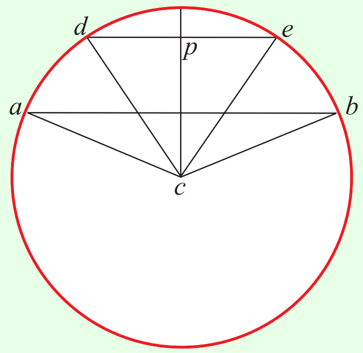
(b) Find the two solutions of the equation

$4\sin^2 x - 3\cos x - 3 = 0$,

where $0^\circ \leq x \leq 180^\circ$.
Give your answers correct to the nearest degree.

(c) [*ab*] and [*de*] are two parallel chords of a circle with centre *c* and radius length *r*.

$cp \perp de, |\angle acb| = 4\beta$ and $|\angle dce| = 2\beta$, where β is in radian measure, $\beta \neq 0$.



(i) If the area of the triangle *acb* equals the area of triangle *dce*, show that $\beta = \frac{\pi}{6}$.

(ii) Calculate the value of *r* if $|ab|^2 + |de|^2 = 24$ and give your answer as a surd.

5 (a) Express sin *A* in terms of *t* if

$\tan A = \frac{t}{2}$, where $t > 0$ and $0^\circ < A < 90^\circ$.

(b) If $\tan A = \frac{1}{2}$, find tan 2*A* without evaluating *A*, where *A* is an acute angle.

Express tan *B* in the form $\frac{a}{b}$, where $a, b \in \mathbf{N}_0$, given that

$\tan(2A + B) = \frac{63}{16}$.

(c) Express sin 2*A* + sin 2*B* as a product in sine and cosine.
If *A* + *B* + *C* = 180°, show that

$\sin(A + B) = \sin C$.

Hence, show that

$\sin 2A + \sin 2B - \sin 2C = 4\cos A \cos B \sin C$.

Note: $\cos(A + B) = -\cos C$.

ANSWERS

4 (a) 30°, 330°

4 (b) 76°, 180°

4 (c) (ii) $r = \sqrt{6}$

5 (a) $\dfrac{t}{\sqrt{t^2 + 4}}$

5 (b) $\frac{4}{3}, \frac{5}{12}$

5 (c) $2\sin(A + B)\cos(A - B)$