

**TRIGONOMETRY (Q 4 & 5, PAPER 2)**

**2000**

- 4 (a) The area of a sector of a circle is  $27 \text{ cm}^2$ . The length of the radius of the circle is 6 cm. Find, in radians, the measure of the angle in the sector.
- 4 (b) Find all the solutions of the equation  $15 \sin^2 x - 4 \cos x - 11 = 0$  in the domain  $0^\circ \leq x \leq 360^\circ$ . Give your answers correct to the nearest degree.
- 4 (c) (i) Derive the formula  $\cos(A + B) = \cos A \cos B - \sin A \sin B$ .
- (ii) Show that  $\cos(A + B) \cos B + \sin(A + B) \sin B = \cos A$ .

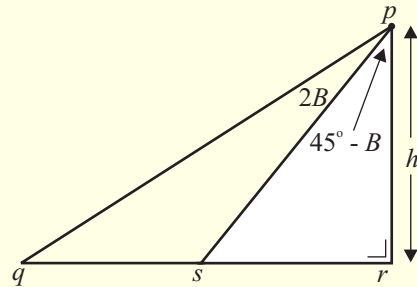
5 (a) Evaluate (i)  $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$  (ii)  $\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin x}$ .

5 (b) (i) Show that  $\frac{1 - \tan^2 A}{1 + \tan^2 A} = \cos 2A$ .

(ii) Hence, or otherwise, find the values of the integers  $l$  and  $k$  such that

$$\frac{1 - \tan^2(135^\circ - A)}{1 + \tan^2(135^\circ - A)} = l \sin kA \text{ for all values for which } \tan(135^\circ - A) \text{ is defined.}$$

- 5 (c) In the triangle  $pqr$ ,  $|\angle qrp| = 90^\circ$  and  $|rp| = h$ .  
 $s$  is a point on  $[qr]$  such that  $|\angle spq| = 2B$  and  
 $|\angle rps| = 45^\circ - B$ ,  $0^\circ < B < 45^\circ$ .



(i) Show that  $|sr| = h \tan(45^\circ - B)$ .

(ii) Hence, or otherwise, show that  $|qs| = 2h \tan 2B$ .

**ANSWERS**

4 (a) (i) 1.5 rad

4 (b)  $66^\circ, 180^\circ, 132^\circ, 228^\circ, 294^\circ$

5 (a) (i) 5 (ii) 2

5 (b) (ii)  $l = -1, k = 2$