Apply Trig Skills to Manipulate Expressions

1.

(a) Using the fact that $\frac{7\pi}{12} = \frac{\pi}{3} + \frac{\pi}{4}$, find the exact value of $\sin\left(\frac{7\pi}{12}\right)$. (3)

(b) Show that $\sin(A + B) + \sin(A - B) = 2\sin A \cos B$. (2)

(c) (i) Express $\frac{\pi}{12}$ in terms of $\frac{\pi}{3}$ and $\frac{\pi}{4}$.

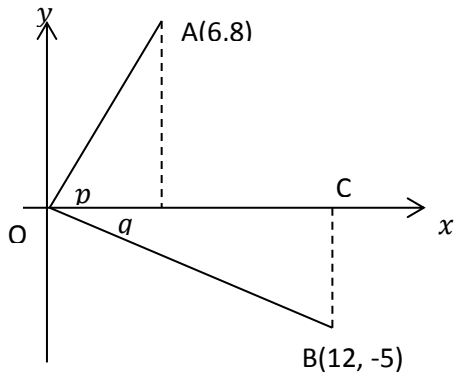
(ii) Hence or otherwise find the exact value of $\sin\left(\frac{7\pi}{12}\right) + \sin\left(\frac{\pi}{12}\right)$. (4)

2.

On the coordinate diagram shown, A is the point (6,8) and B is the point (12, -5).

Angle AOC = p and angle COB = .

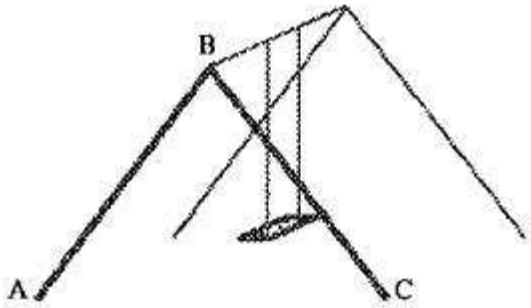
Find the exact value of $\sin(p + q)$.

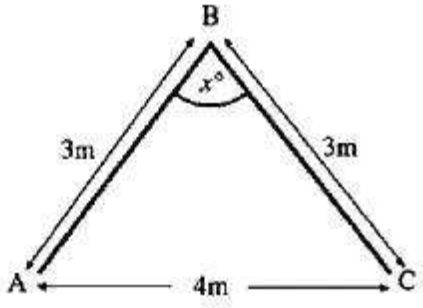


(4)

3.

The framework of a child's swing has dimensions as shown in the diagram on the right. Find the exact value of $\sin x$.



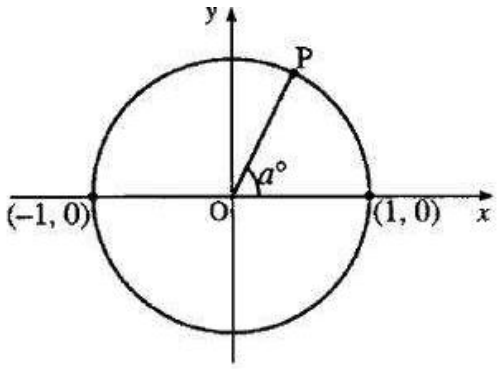


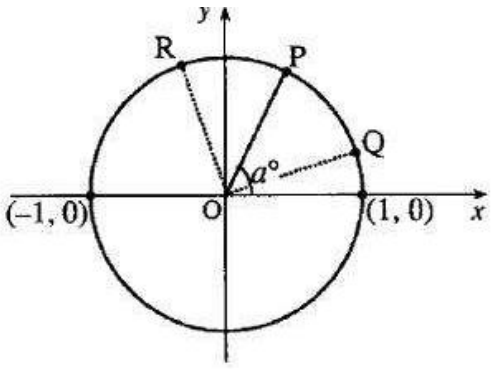
(5)

4.

The diagram shows a circle of radius 1 unit and centre the origin.

The radius OP makes an angle $a°$ with the positive direction of the x-axis.





(a) Show that P is the point $(\cos a°,\ \sin a°)$. (1)

(b) If angle POQ = 45°, deduce the coordinates of Q in terms of a. (1)

(c) If angle POR = 45°, deduce the coordinates of R in terms of a. (1)

(d) Hence find an expression for the gradient of QR in simplest form. (4)