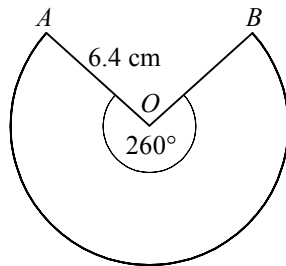


- 1 Find, in radians to 2 decimal places, the values of  $\theta$  in the interval  $0 \leq \theta \leq 2\pi$  for which
- a  $\sin(\theta + \frac{\pi}{4}) = 0.4$ , (3)
- b  $1 - 3 \cos 2\theta = 0$ . (5)
- 2 a Sketch the curve  $y = \sin 3x$  for  $x$  in the interval  $0 \leq x \leq 180^\circ$ , showing the coordinates of the turning points of the curve. (3)
- b Solve, for  $\theta$  in the interval  $0 \leq \theta \leq 360^\circ$ , the equation
- $$\tan^2 \theta - 2 \tan \theta - 3 = 0. \quad (6)$$

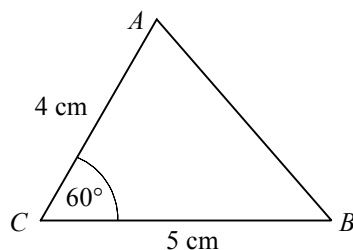
3



The diagram shows the major sector  $OAB$  of a circle, centre  $O$ , radius 6.4 cm. The reflex angle subtended by the major arc  $AB$  at  $O$  is  $260^\circ$ .

- a Express  $260^\circ$  in radians, correct to 3 decimal places. (1)
- b Find the perimeter of the major sector  $OAB$ . (3)
- c Find the area of the major sector  $OAB$ . (2)
- 4 Solve, for  $\theta$  in the interval  $0 \leq \theta \leq 360^\circ$ , the equation
- $$3 \cos^2 \theta + 6 \cos \theta = 2 \sin^2 \theta + 6,$$
- giving your answers to 1 decimal place. (7)

5

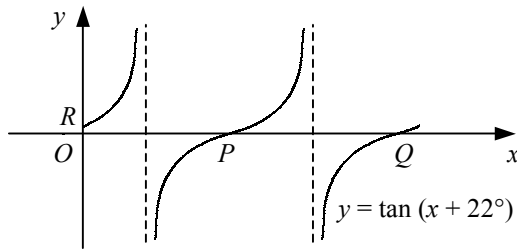


The diagram shows triangle  $ABC$  in which  $AC = 4$  cm,  $BC = 5$  cm and  $\angle ACB = 60^\circ$ .

- a Find the exact area of triangle  $ABC$ . (2)
- b Show that  $AB = \sqrt{21}$  cm. (3)
- c Find the value of  $\sin(\angle ABC)$  in the form  $k\sqrt{7}$  where  $k$  is an exact fraction. (3)
- 6 Find, to 1 decimal place, the values of  $x$  in the interval  $0 \leq x \leq 360$  for which
- $$\tan(2x + 15)^\circ = 2. \quad (6)$$
- 7 Find the values of  $\theta$  in the interval  $0 \leq \theta \leq 360^\circ$  for which
- $$\sin \theta \tan \theta - \cos \theta = 1. \quad (8)$$

- 8 The line with equation  $y = 6$  intersects the circle with equation  $x^2 + y^2 - 10x - 2y - 3 = 0$  at the points  $P$  and  $Q$ .
- Find the coordinates of the centre and the radius of the circle. (3)
  - Find the coordinates of the points  $P$  and  $Q$ . (3)
  - Find the area of the minor segment enclosed by the chord  $PQ$  and the circle. (6)
- 9 Find the values of  $\theta$  in the interval  $0 \leq \theta \leq 360^\circ$  for which
- $$5 \sin^2 \theta + 5 \sin \theta + 2 \cos^2 \theta = 0. \quad (8)$$

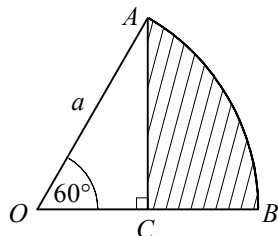
10



The diagram shows the curve  $y = \tan(x + 22^\circ)$  for  $x$  in the interval  $0 \leq x \leq 360^\circ$ .

- Write down the coordinates of the points  $P$  and  $Q$  where the curve crosses the  $x$ -axis. (2)
  - Find the coordinates of the point  $R$  where the curve meets the  $y$ -axis. (1)
  - Write down the equations of the curve's asymptotes. (2)
- 11 a Find, to 1 decimal place, the values of  $x$  in the interval  $0 \leq x \leq 360^\circ$ , for which
- $$5 \sin x = 2 \cos x. \quad (4)$$
- b Solve, for  $y$  in the interval  $0 \leq y \leq 2\pi$ , the equation
- $$2 \sin^2 y - \sin y = 1,$$
- giving your answers in terms of  $\pi$ . (6)
- 12 Solve, for  $\theta$  in the interval  $-180^\circ \leq \theta \leq 180^\circ$ , the equation
- $$3 \cos^2 \theta - 5 \cos \theta + 2 \sin^2 \theta = 0,$$
- giving your answers to 1 decimal place. (7)

13



The diagram shows the circular sector  $OAB$ , centre  $O$ . The point  $C$  lies on  $OB$  such that  $AC$  is perpendicular to  $OB$ .

Given that  $OA = a$ , and that  $\angle AOB = 60^\circ$ ,

- find the area of sector  $OAB$  in terms of  $a$  and  $\pi$ , (3)
- find the length  $OC$  in terms of  $a$ , (1)
- show that the area of the shaded region bounded by the arc  $AB$  and the straight lines  $AC$  and  $BC$  is given by  $\frac{1}{24} a^2 (4\pi - 3\sqrt{3})$ . (5)