

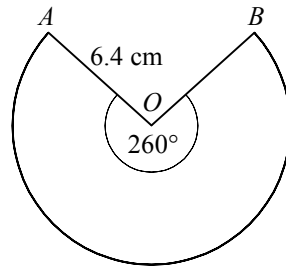
- 1 a Sketch the curve $y = \sin 3x^\circ$ for x in the interval $0 \leq x \leq 180$, showing the coordinates of the turning points of the curve. (3)

- b Solve the equation

$$\sin 3x^\circ = \frac{1}{2},$$

- giving all values of x such that $0 \leq x \leq 180$. (4)

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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° .

- a Express 260° 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)
- 3 a Show that the equation

$$3 \cos^2 \theta + 6 \cos \theta = 2 \sin^2 \theta + 6$$

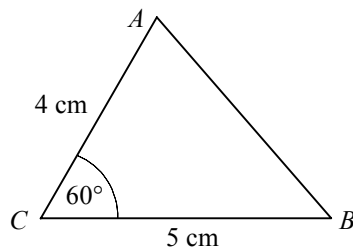
may be written as

$$5 \cos^2 \theta + 6 \cos \theta - 8 = 0. \quad (2)$$

- b Hence find all values of θ in the interval $0 \leq \theta \leq 360^\circ$, for which

$$3 \cos^2 \theta + 6 \cos \theta = 2 \sin^2 \theta + 6. \quad (5)$$

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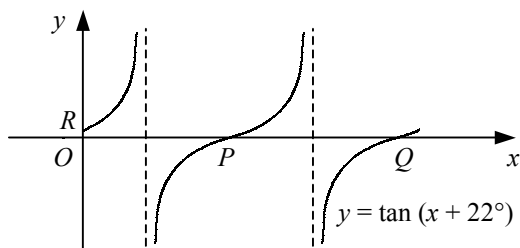


The diagram shows triangle ABC in which $AC = 4$ cm, $BC = 5$ cm and $\angle ACB = 60^\circ$.

- 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)
- 5 a Sketch the curve $y = \sin x^\circ$ for x in the interval $0 \leq x \leq 360$. (1)
 b Sketch on the same diagram the curve $y = \sin(x + 45)^\circ$ for x in the interval $0 \leq x \leq 360$. (2)
 c Solve, for x in the interval $0 \leq x \leq 360$, the equation
- $$\sin x^\circ = \sin(x + 45)^\circ. \quad (3)$$

- 6 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)
- 7 Find the values of θ in the interval $0 \leq \theta \leq 360^\circ$ for which
- $$5 \sin^2 \theta + 5 \sin \theta + 2 \cos^2 \theta = 0. \quad (8)$$

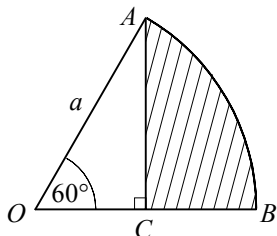
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The diagram shows the curve $y = \tan(x + 22^\circ)$ for x in the interval $0 \leq x \leq 360^\circ$.

- 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)
- 9
- Find, to 1 decimal place, the values of x in the interval $0 \leq x \leq 360^\circ$, for which
- $$5 \sin x = 2 \cos x. \quad (4)$$
- 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 π . (6)
- 10 Solve, for θ 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)

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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 π , (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 $\frac{1}{24} a^2 (4\pi - 3\sqrt{3})$. (4)