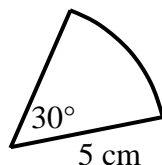


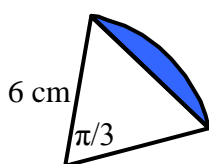
Section 2: Circular measure

Section test

1. Find the perimeter and area of this sector.



2. A sector of a circle with radius 5 cm has arc length 12 cm . Find the angle of the sector, in radians.
3. A sector of a circle has perimeter 28 cm and area 48 cm^2 . Find two possible values for the radius of the circle.
4. Find the area of the shaded segment.



5. The arc length of a sector of radius 8 cm is $3\pi\text{ cm}$.
Find the area of the sector, giving your answers in terms of π .
6. The area of a sector with an angle of 45° is $2\pi\text{ cm}^2$.
Find its perimeter. Give your answer correct to 2 d.p.
7. The expression $\sin 3x + 2\cos x$ can be approximated for small values of x by the polynomial $a + bx + cx^2$. Find the values of a , b and c .
8. The expression $x \tan x + \cos 2x - 3\sin 4x$ can be approximated for small values of x by the polynomial $a + bx + cx^2$. Find the values of a , b and c .
9. Use small angle approximations to find an approximation to the smallest positive root of the equation $\cos x = 6x$.

Edexcel A level Trigonometry 2 section test solutions

Solutions to section test

1. $30^\circ = 30 \times \frac{\pi}{180} = \frac{\pi}{6}$ radians

$$\text{Arc length} = r\theta = 5 \times \frac{\pi}{6} = 2.62 \text{ cm}$$

$$\text{so perimeter} = 2.62 + 5 + 5 = 12.6 \text{ cm (3 s.f.)}$$

$$\text{Area} = \frac{1}{2}r^2\theta = \frac{1}{2} \times 5^2 \times \frac{\pi}{6} = 6.54 \text{ cm}^2 \text{ (3 s.f.)}$$

2. Arc length = $r\theta$

$$12 = 5\theta$$

$$\theta = 2.4 \text{ radians}$$

3. $2r + r\theta = 28 \Rightarrow r\theta = 28 - 2r$

$$\frac{1}{2}r^2\theta = 48$$

$$r^2\theta = 96$$

$$r(28 - 2r) = 96$$

$$28r - 2r^2 = 96$$

$$r^2 - 14r + 48 = 0$$

$$(r - 6)(r - 8) = 0$$

The radius is 6 cm or 8 cm.

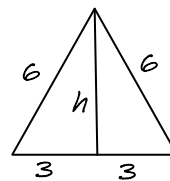
4. Area of sector = $\frac{1}{2}r^2\theta = \frac{1}{2} \times 6^2 \times \frac{\pi}{3} = 6\pi$

Triangle is equilateral since all angles are 60°

$$\text{Height of triangle} = \sqrt{6^2 - 3^2} = \sqrt{27}$$

$$\text{Area of triangle} = 3\sqrt{27}$$

$$\text{Area of segment} = 6\pi - 3\sqrt{27} = 3.26 \text{ cm}^2$$



5. Arc length = $r\theta \Rightarrow 3\pi = 8\theta$

$$\Rightarrow \theta = \frac{3}{8}\pi$$

$$\text{Area of sector} = \frac{1}{2}r^2\theta = \frac{1}{2} \times 8^2 \times \frac{3}{8}\pi = 12\pi \text{ cm}^2$$

6. $45^\circ = 45 \times \frac{\pi}{180} = \frac{1}{4}\pi$

$$\text{Area} = \frac{1}{2}r^2\theta \Rightarrow 2\pi = \frac{1}{2}r^2 \times \frac{1}{4}\pi$$

$$\Rightarrow r^2 = 16$$

$$\Rightarrow r = 4$$

Edexcel A level Trigonometry 2 section test solutions

$$\text{Arc length} = r\theta = 4 \times \frac{1}{4}\pi = \pi$$

$$\text{Perimeter of sector} = \pi + 4 + 4 = (\pi + 8) \text{ cm.}$$

$$7. \quad \sin 3x + 2 \cos x \approx 3x + 2\left(1 - \frac{1}{2}x^2\right)$$

$$= 2 + 3x - x^2$$

$$a = 2, b = 3, c = -1$$

$$8. \quad x \tan x + \cos 2x - 3 \sin 4x \approx x \times x + \left(1 - \frac{1}{2}(2x)^2\right) - 3 \times 4x$$

$$= x^2 + 1 - 2x^2 - 12x$$

$$= 1 - 12x - x^2$$

$$a = 1, b = -12, c = -1$$

$$9. \quad \cos x = 6x$$

using small angle approximations,

$$1 - \frac{1}{2}x^2 = 6x$$

$$x^2 + 12x - 2 = 0$$

$$x = \frac{-12 \pm \sqrt{144 - 4 \times 1 \times -2}}{2} = \frac{-12 \pm \sqrt{152}}{2}$$

Smallest positive root ≈ 0.164