FURTHER TRIGONOMETRY - CHAPTER REVIEW

1 The minute hand of a clock is 1.2 metres long. How far does the tip move in 40 minutes?

2 An arc AB of length 6 cm subtends an angle of 56° at the centre of a circle. Calculate:

(a) the length of the radius **(b)** the length of the chord AB.

3 Find the exact value of $\sec^2 \frac{\pi}{4} + \operatorname{cosec}^2 \frac{\pi}{4}$.

4 Solve, for $-\pi \leq x \leq \pi$, $6\cos^2 x - 5\cos x + 1 = 0$.

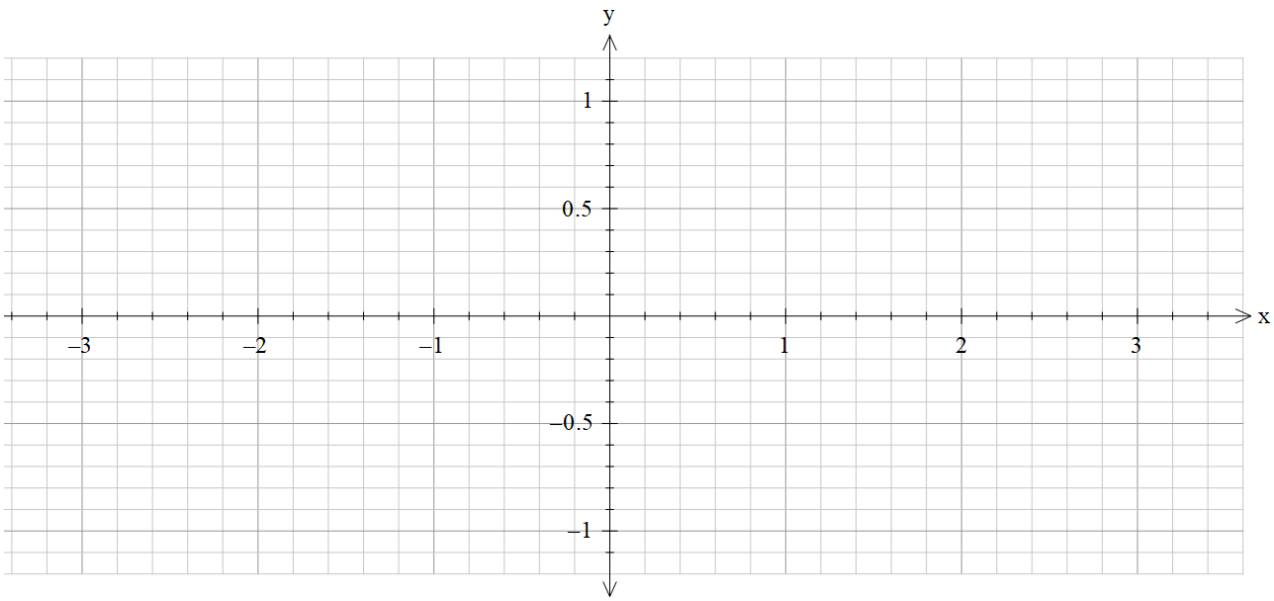
5 An arc AB of a sector of a circle is $\frac{\pi}{4}$ metres long and subtends an angle of 60° at the centre, O, of the circle.
Calculate: **(a)** the length of the radius
(b) the area of the sector AOB (correct to 1 decimal place)
(c) the length of the chord AB (correct to 1 decimal place).

6 Find all values of θ between 0 and 2π for which:

(a) $\sin\theta = -0.5$ **(b)** $\cos\theta = 0$ **(c)** $\tan\theta = -1$

(d) $\sec\theta = \frac{2}{\sqrt{3}}$ **(e)** $\cot\theta = \sqrt{3}$ **(f)** $\operatorname{cosec}\theta = \sqrt{2}$

7 Draw the graph of $y = \cos 2x$ for $-\pi \leq x \leq \pi$. On the same set of axes, draw the graph of $y = -\frac{x}{2}$. Use your graphs to solve the equation $\cos 2x = -\frac{x}{2}$.



9 Express in radians, in terms of π: **(a)** 45° **(b)** 240° **(c)** 160° **(d)** −210°

10 Express in radians, correct to 4 decimal places: **(a)** 65° **(b)** 281° **(c)** −100° **(d)** −326°

11 Express in degrees the angles whose radian measures are: **(a)** $\frac{4\pi}{5}$ **(b)** $\frac{7\pi}{6}$ **(c)** $\frac{23\pi}{12}$ **(d)** $-\frac{3\pi}{2}$

12 Express in degrees and minutes, to the nearest minute, the angles whose radian measures are:

(a) 2.6 **(b)** -1.4 **(c)** 0.341 **(d)** -3

13 Simplify: **(a)** $\sin(\pi + x)$ **(b)** $\cos(2\pi - x)$ **(c)** $\tan(\pi - x)$

14 Write the exact value of: **(a)** $\cos\pi$ **(b)** $\tan\frac{7\pi}{6}$ **(c)** $\sin\frac{3\pi}{4}$ **(d)** $\cos\frac{5\pi}{3}$

15 Solve for $0 < x < 2\pi$: **(a)** $\sin x = -\frac{1}{2}$ **(b)** $\sin x = \sqrt{3}\cos x$ **(c)** $\sqrt{2}\cos x + 1 = 0$

16 Simplify: **(a)** $\sin\left(\frac{\pi}{2}-x\right)$ **(b)** $\cos\left(\frac{3\pi}{2}+x\right)$ **(c)** $\tan\left(\frac{\pi}{2}+x\right)$