

Oliver Murphy: Discovering Maths 4: EXERCISE 4A

1.

$$\theta = \frac{l}{r} = \frac{15}{5} = 3 \text{ radians}$$

2.

$$\theta = \frac{l}{r} \Rightarrow l = r\theta = 2 \times 12 = 24 \text{ mm}$$

3.

$$\theta = \frac{l}{r} \Rightarrow l = r\theta = 2.5 \times 6 = 15 \text{ cm}$$

4.

$$\theta = \frac{l}{r} = \frac{35}{14} = 2.5 \text{ radians}$$

5.

$$r = \frac{d}{2} = \frac{8}{2} = 4 \text{ cm}$$

$$\theta = \frac{l}{r} = \frac{5}{4} = 1.25 \text{ radians}$$

6.

$$\theta = \frac{l}{r} = \frac{19}{12} = 1.58 \text{ radians}$$

7.

$$\theta = \frac{l}{r} \Rightarrow r\theta = l \Rightarrow r = \frac{l}{\theta} = \frac{24}{2.5} = 9.6 \text{ mm}$$

8.

$$\frac{3\pi}{2} \text{ radians} = \frac{3 \times 180}{2} \text{ degrees} = 270^\circ$$

$$225^\circ = 225 \times \frac{\pi}{180} \text{ radians} = \frac{5\pi}{4} \text{ radians}$$

$$\frac{5\pi}{6} \text{ radians} = \frac{5 \times 180}{6} \text{ degrees} = 150^\circ$$

$$210^\circ = 210 \times \frac{\pi}{180} \text{ radians} = \frac{7\pi}{6} \text{ radians}$$

$$\frac{3\pi}{8} \text{ radians} = \frac{3 \times 180}{8} \text{ degrees} = 67.5^\circ$$

$$300^\circ = 300 \times \frac{\pi}{180} \text{ radians} = \frac{5\pi}{3} \text{ radians}$$

$$1200^\circ = 1200 \times \frac{\pi}{180} \text{ radians} = \frac{20\pi}{3} \text{ radians}$$

9. (i) 90° (ii) $90^\circ = 90 \times \frac{\pi}{180} \text{ radians} = \frac{\pi}{2} \text{ radians}$

10. (i) 60° **(ii)** $60^\circ = 60 \times \frac{\pi}{180}$ radians $= \frac{\pi}{3}$ radians

11. (i)

$$|\angle adb| = \frac{1}{2} |\angle acb| \text{ (Angle at circle theorem)}$$

$$\Rightarrow |\angle adb| = \frac{1}{2} \times 90^\circ = 45^\circ$$

(ii)

$$45^\circ = 45 \times \frac{\pi}{180} \text{ radians} = \frac{\pi}{4} \text{ radians}$$

12.

$$1 \text{ radian} = 1 \times \frac{180}{\pi} \text{ degrees} = 57^\circ$$

13. (i) $2.5 \times 360^\circ = 900^\circ$ **(ii)** $2.5 \times 2\pi = 5\pi$ radians

14.

$$\frac{55\pi}{9} \text{ radians} = \frac{55 \times 180}{9} \text{ degrees} = 1100^\circ$$