

Exercise 4(e) page 203-4.

Question 3

(iv) $\frac{\pi}{126} \rightarrow$ degrees.

(4.27) $x \text{ rad} = \left(\frac{x \times 180}{\pi} \right)^\circ$

$$\frac{\pi}{126} = \left(\frac{\pi \times 180}{126 \pi} \right)^\circ = \left(\frac{180}{126} \right)^\circ = \left(\frac{10}{7} \right)^\circ$$

(v) $200 = \left(\frac{200 \times 180}{\pi} \right)^\circ = (1.15 \times 10^4)^\circ$
 $= 11500^\circ$

$\cos(n\pi) = -1$ provided
 n is odd

4.(ii) $\cos\left(\frac{7\pi}{2}\right) = 0$

(iii) $\frac{\cos(7\pi)}{2} = -\frac{1}{2}$

5. $\frac{\pi}{2} \sin\left(\frac{\pi}{4}\right) = \frac{\pi}{2} \sin(45^\circ) = \frac{\pi}{2} \cdot \frac{1}{\sqrt{2}} = \frac{\pi}{\sqrt{2} \cdot 2}$

$$\frac{\pi}{4} = 45^\circ$$

Exercise 4(g) Page 218

$$3. (i) \cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$$

Soln:

$$\cos(2\theta) = \cos(\theta + \theta)$$

$$(4.39) \quad \cos(A+B) = \cos(A)\cos(B) - \sin(A)\sin(B)$$

$$\begin{aligned} \cos(\theta + \theta) &= \cos(\theta)\cos(\theta) - \sin(\theta)\sin(\theta) \\ &= \cos^2(\theta) - \sin^2(\theta) \end{aligned}$$

4.

$$1 + \cot^2(\theta) = \operatorname{cosec}^2(\theta)$$

Soln:

$$\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$$

LHS:

$$1 + \frac{\cos^2(\theta)}{\sin^2(\theta)} = \frac{\sin^2(\theta) + \cos^2(\theta)}{\sin^2(\theta)}$$

$$= \frac{1}{\sin^2(\theta)}$$

$$\frac{1}{\sin(\theta)} = \operatorname{cosec}(\theta)$$

$$\begin{aligned} &= \left(\frac{1}{\sin(\theta)}\right)^2 = (\operatorname{cosec}(\theta))^2 \\ &= \operatorname{cosec}^2(\theta). \end{aligned}$$