

$$\begin{aligned}
 1. \quad \text{Simplify } \sec(-\theta) \sin(-\theta) &= \sec \theta (-\sin \theta) \\
 &= \frac{1}{\cos \theta} \cdot -\sin \theta \\
 &= -\tan \theta
 \end{aligned}$$

2

Prove the identity: $\sin \theta + \cos \theta = \frac{2 \sin^2 \theta - 1}{\sin \theta - \cos \theta}$

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

- 3 Solve $\sec x \sin x = 2 \sin x$ for $0 \leq x < 2\pi$.

$$\sec x \sin x - 2 \sin x = 0$$

$$\sin x (\sec x - 2) = 0$$

$$\underline{\sin x = 0} \quad \text{OR} \quad \sec x = 2$$

$$\underline{\cos x = \frac{1}{2}}$$

$$X = \underline{0}, \underline{\frac{\pi}{3}}, \underline{\pi}, \underline{\frac{5\pi}{3}}$$

- 4 Solve $2 \sin^3 x - \sin^2 x = 2 \sin x - 1$ for $0 \leq x < 2\pi$.

$$2 \sin^3 x - \sin^2 x - 2 \sin x + 1 = 0$$

$$(2u^3 - u^2)(2u + 1) = 0 \quad u = \sin x$$

$$u^2(2u - 1) - 1(2u - 1) = 0$$

$$(2u - 1)(u^2 - 1) = 0$$

$$(2u - 1)(u + 1)(u - 1) = 0$$

$$\sin x = \frac{1}{2} \quad \text{OR} \quad \sin x = -1 \quad \text{OR} \quad \sin x = 1$$

$$X = \frac{\pi}{6}, \frac{5\pi}{6} \quad X = \frac{3\pi}{2} \quad X = \frac{\pi}{2}$$