

Ch 6 5, 11, 24, 38, 40

54 - 66 E

$$\textcircled{5} \frac{1 - \tan x}{\sin x} = \csc x - \sec x$$

$$\frac{1}{\sin x} - \frac{\tan x}{\sin x}$$

$$\csc x - \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}$$

$$\csc x - \frac{1}{\cos x}$$

$$\csc x - \sec x$$

$$\textcircled{11} \frac{1}{\sin \theta + \cos \theta} + \frac{1}{\sin \theta - \cos \theta} = \frac{2 \sin \theta}{\sin^4 \theta - \cos^4 \theta}$$

$$\frac{\sin \theta - \cos \theta + \sin \theta + \cos \theta}{\sin^2 \theta - \cos^2 \theta}$$

$$\frac{2 \sin \theta}{\sin^2 \theta - \cos^2 \theta} \cdot \frac{\sin^2 \theta + \cos^2 \theta}{\sin^2 \theta + \cos^2 \theta}$$

$$\frac{2 \sin \theta}{\sin^4 \theta - \cos^4 \theta}$$

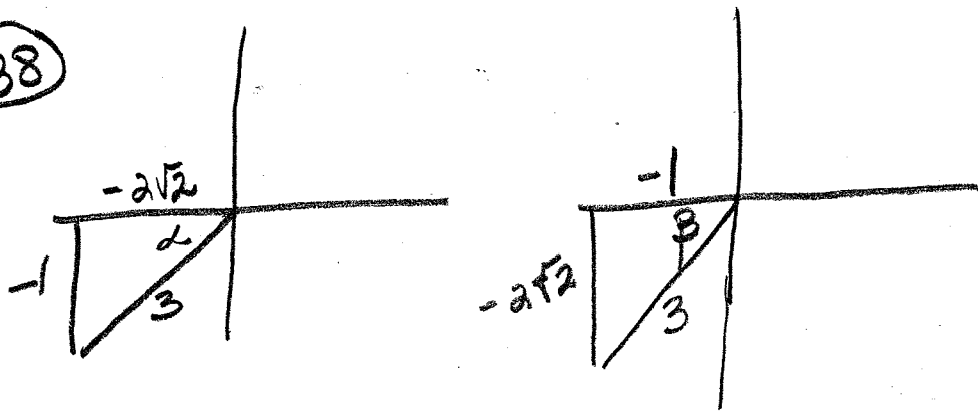
$$\textcircled{24} \quad \cos^4 t - \sin^4 t = \cos 2t$$

$$(\cos^2 t + \sin^2 t)(\cos^2 t - \sin^2 t)$$

$$(1)(\cos^2 t - \sin^2 t)$$

$$1 (\cos 2t)$$

$\textcircled{38}$



$$a) \sin(\alpha + \beta) = \sin \alpha \cos \beta + \sin \beta \cos \alpha$$

$$\left(-\frac{1}{3}\right)\left(-\frac{1}{3}\right) + \left(-\frac{2\sqrt{2}}{3}\right)\left(-\frac{2\sqrt{2}}{3}\right)$$

$$\frac{1}{9} + \frac{8}{9} = 1$$

$$b. \cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\left(-\frac{2\sqrt{2}}{3}\right)\left(-\frac{1}{3}\right) + \left(-\frac{1}{3}\right)\left(-\frac{2\sqrt{2}}{3}\right)$$

$$\frac{2\sqrt{2}}{9} + \frac{2\sqrt{2}}{9} = \frac{4\sqrt{2}}{9}$$

$$c. \tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta} = \frac{-\frac{1}{2\sqrt{2}} + \frac{-2\sqrt{2}}{-1}}{1 - \left(-\frac{1}{2\sqrt{2}}\right)\left(-\frac{2\sqrt{2}}{-1}\right)}$$

38c cont'd

$$\frac{\frac{\sqrt{2}}{4} + 2\sqrt{2}}{1-1} \quad \text{undefined}$$

d. $\sin 2\alpha = 2\sin\alpha\cos\alpha$

$$2\left(-\frac{1}{3}\right)\left(-\frac{2\sqrt{2}}{3}\right) = \frac{4\sqrt{2}}{9}$$

e. $\cos \frac{\beta}{2} = -\sqrt{\frac{1+\cos\beta}{2}} = -\sqrt{\frac{1+(\frac{1}{2})}{2}}$

$$= -\sqrt{\frac{\frac{3}{2}}{2}} = -\sqrt{\frac{3}{4}}$$

$$= -\frac{\sqrt{3}}{2}$$

(40)

$$\frac{2 \tan \frac{5\pi}{12}}{1 - \tan^2 \frac{5\pi}{12}}$$

$$\tan 2\theta =$$

$$\theta = \frac{5\pi}{12}$$

$$\tan 2\left(\frac{5\pi}{12}\right) = \tan \frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$$

54

$$\cos 2x = -1$$

$[0, 2\pi)$

$$\text{or } 2x = \pi$$

$$2\cos^2 x - 1 = -1$$

$$x = \frac{\pi}{2}$$

$$2\cos^2 x = 0$$

$$\cos^2 x = 0$$

$$2x = 3\pi$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$x = \frac{3\pi}{2}$$

56

$$\tan \frac{x}{2} = -1$$

$$\frac{x}{2} = \frac{3\pi}{4}$$

$$\text{or } \frac{x}{2} = \frac{7\pi}{4}$$

$$x = \frac{3\pi}{2}$$

$$x = \frac{7\pi}{2} \text{ out of domain}$$

$$\left\{ \frac{3\pi}{2} \right\}$$

58

$$\cos^2 x - 2\cos x - 3 = 0$$

$$(\cos x - 3)(\cos x + 1) = 0$$

$$\cos x = -1$$

$$\left\{ \pi \right\}$$

$$(60) \quad 4 \sin^2 x = 1$$

$$\sin^2 x = \frac{1}{4}$$

$$\sin x = \pm \frac{1}{2}$$

$$\left\{ \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6} \right\}$$

$$(62) \quad \sin 2x = \sqrt{3} \sin x$$

$$2 \sin x \cos x - \sqrt{3} \sin x = 0$$

$$\sin x (2 \cos x - \sqrt{3}) = 0$$

$$\sin x = 0$$

$$x = 0, \pi$$

$$2 \cos x = \sqrt{3}$$

$$\cos x = \frac{\sqrt{3}}{2}$$

$$x = \frac{\pi}{6}, \frac{11\pi}{6}$$

$$\left\{ 0, \frac{\pi}{6}, \pi, \frac{11\pi}{6} \right\}$$

$$(64) \quad \sin x = -0.6031$$

$$x = \sin^{-1}(-0.6031)$$

$$Q \text{ III} + \text{IV}$$

$$\text{ref } \angle = .6474$$

$$Q \text{ III} = \pi + .6474$$

$$\approx 3.7890$$

$$Q \text{ IV}$$

$$2\pi - .6474$$

$$\approx 5.6358$$

$$\textcircled{66} \sec^2 x - 4 \tan x + 2 = 0$$

$$1 + \tan^2 x - 4 \tan x + 2 = 0$$

$$\tan^2 x - 4 \tan x + 3 = 0$$

$$(\tan x - 3)(\tan x - 1) = 0$$

$$\tan x = 3$$

$$\tan x = 1$$

$$x \approx 1.2490 \quad \text{Q I}$$

$$x = \frac{\pi}{4}, \frac{5\pi}{4}$$

$$\pi + 1.2490 \quad \text{Q III}$$

$$\approx 4.3906$$

$\textcircled{68}$

$$d = -6 \cos \frac{\pi}{2} t$$

3 below means

$$d = -3$$

$$-3 = -6 \cos \frac{\pi}{2} t$$

$$\frac{1}{2} = \cos \frac{\pi}{2} t$$

$$\frac{\pi}{2} t = \frac{\pi}{3} + 2\pi k \quad \text{Q I}$$

$$t = \frac{2}{3} + 4k\pi$$

$$\frac{\pi}{2} t = \frac{5\pi}{3} + 2\pi k \quad \text{Q IV}$$

$$t = \frac{10}{3} + 4k$$