

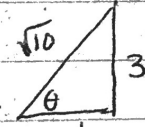
pg. 355-357

#1-10 all

#11-67 odds

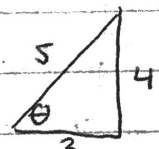
1. $\frac{1}{\cos \theta}$
2. $\tan \theta$
3. $\tan^2 \theta$
4. $\sin \theta$
5. $-\tan \theta$
6. $\sin \alpha \cos \beta + \cos \alpha \sin \beta$
7. $\cos 2\theta$
8. $\cos \frac{\theta}{2}$
9. $\sin^2 \theta$
10. $\frac{1}{2} (\cos \alpha \cos \beta + \sin \alpha \sin \beta + \cos \alpha \cos \beta - \sin \alpha \sin \beta)$
 $\frac{1}{2} (2 \cos \alpha \cos \beta)$
 $\cos \alpha \cos \beta$

11. $\tan \theta = 3$



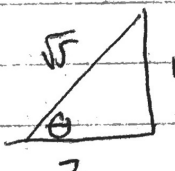
$\sec \theta = \frac{1}{\cos \theta} = \frac{1}{\frac{1}{\sqrt{10}}} = \sqrt{10}$
 $\cos \theta = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

13. $\cos \theta = \frac{3}{5}$



$\csc \theta = \frac{1}{\sin \theta} = \frac{1}{\frac{4}{5}} = \frac{5}{4}$
 $\tan \theta = \frac{4}{3}$

15. $\cot \theta = -2$



$\sec \theta = \frac{1}{\cos \theta} = \frac{1}{\frac{2}{\sqrt{5}}} = \frac{\sqrt{5}}{2}$
 $\sin \theta = \frac{-1}{\sqrt{5}} = \frac{-\sqrt{5}}{5}$

17. $\sin^2(-x) + \cos^2(x) = 1$

19. $\frac{\sec^2 x - \tan^2 x}{\cos(-x)} = \frac{(\tan^2 x + 1) - \tan^2 x}{\cos(x)} = \frac{1}{\cos(x)} = \sec x$

21. $\frac{1}{1 - \sin x} \cdot \frac{1 + \sin x}{1 + \sin x} = \frac{1 + \sin x}{1 - \sin^2 x} = \frac{1 + \sin x}{\cos^2 x} = \frac{1}{\cos^2 x} + \frac{\sin x}{\cos^2 x} = \sec^2 x + \sec x \tan x$

$$23. \frac{\sin \theta}{1 - \cos \theta} + \frac{\sin \theta}{1 + \cos \theta} = 2 \csc \theta$$

$$\frac{\sin \theta (1 + \cos \theta) + \sin \theta (1 - \cos \theta)}{(1 - \cos \theta)(1 + \cos \theta) (1 + \cos \theta)(1 - \cos \theta)}$$

$$\frac{\sin \theta + \sin \theta \cos \theta + \sin \theta - \sin \theta \cos \theta}{1 - \cos^2 \theta}$$

$$\frac{2 \sin \theta}{\sin^2 \theta}$$

$$\frac{2}{\sin \theta} = 2 \csc \theta \checkmark$$

$$25. \frac{\cot \theta}{1 + \csc \theta} + \frac{1 + \csc \theta}{\cot \theta} = 2 \sec \theta$$

$$\frac{\cot^2 \theta}{\cot \theta + \cot \theta \csc \theta} + \frac{1 + 2 \csc \theta + \csc^2 \theta}{\cot \theta + \cot \theta \csc \theta}$$

$$\frac{2 \csc^2 \theta + 2 \csc \theta}{\cot \theta + \cot \theta \csc \theta}$$

$$\frac{2 \csc \theta (\csc \theta + 1)}{\cot \theta (1 + \csc \theta)}$$

$$\frac{2 \csc \theta}{\cot \theta}$$

$$2 \cdot \frac{1}{\sin \theta} \cdot \frac{\cos \theta}{\sin \theta} = 2 \frac{\cos \theta}{\sin^2 \theta}$$

$$= 2 \frac{1}{\cos \theta} = 2 \sec \theta \checkmark$$

$$27. \frac{\cot^2 \theta}{1 + \csc \theta} = \csc \theta - 1$$

$$\frac{(1 - \csc \theta) \cot^2 \theta}{1 - \csc^2 \theta}$$

$$\frac{(1 - \csc \theta) \cot^2 \theta}{1 - \csc^2 \theta}$$

$$\frac{-\cot^2 \theta}{-(1 - \csc \theta)}$$

$$\frac{\cot^2 \theta}{1 - \csc \theta}$$

$$\csc \theta - 1 \checkmark$$

$$\csc \theta - 1 \checkmark$$

$$29. \frac{\sec\theta + \csc\theta}{1 + \tan\theta} = \csc\theta$$

~~$$\frac{(1 - \tan\theta)(\sec\theta + \csc\theta)}{1 - \tan^2\theta}$$

$$\frac{\sec\theta + \csc\theta - \tan\theta\sec\theta - \tan\theta\csc\theta}{1 - \tan^2\theta}$$~~

$$\frac{\frac{1}{\cos\theta} + \frac{1}{\sin\theta}}{1 + \frac{\sin\theta}{\cos\theta}}$$

$$\frac{\frac{\sin\theta}{\sin\theta\cos\theta} + \frac{\cos\theta}{\sin\theta\cos\theta}}$$

$$\frac{\cos\theta + \sin\theta}{\cos\theta}$$

$$\frac{\sin\theta + \cos\theta}{\sin\theta\cos\theta}$$

$$\frac{\cos\theta + \sin\theta}{\cos\theta}$$

$$\frac{\sin\theta + \cos\theta}{\sin\theta\cos\theta} \cdot \frac{\cos\theta}{\cos\theta + \sin\theta}$$

$$\frac{1}{\sin\theta} = \csc\theta \quad \checkmark$$

$$31. \frac{\sin\theta}{\sin\theta + \cos\theta} = \frac{\tan\theta}{1 + \tan\theta}$$

$$= \frac{\sin\theta}{\cos\theta} \cdot \frac{1}{1 + \frac{\sin\theta}{\cos\theta}}$$

$$= \frac{\sin\theta}{\cos\theta} \cdot \frac{\cos\theta}{\cos\theta + \sin\theta}$$

$$= \frac{\sin\theta \cdot \cos\theta}{\cos\theta \cdot (\cos\theta + \sin\theta)}$$

$$= \frac{\sin\theta}{\cos\theta + \sin\theta} \quad \checkmark$$

$$33. 2\sin x = \sqrt{2}$$

$$\sin x = \frac{\sqrt{2}}{2}$$

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

$$35. \tan^2 x - 3 = 0$$

$$\tan^2 x = 3$$

$$\tan x = \pm\sqrt{3}$$

$$\tan x = \pm \frac{\sqrt{3}}{2} \cdot \frac{\sin}{\frac{1}{2} \cos}$$

$$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$37. 2\sin^2 x = \sin x$$

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

$$\sin x(2\sin x - 1) = 0$$

$$\sin x = 0 \quad \sin x = \frac{1}{2}$$

$$x = 0, \pi$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$39. \sin^2 x - \sin x = 0$$

$$\sin x(\sin x - 1) = 0$$

$$\sin x = 0 \quad \sin x = 1$$

$$x = 0, \pi \quad x = \frac{\pi}{2}$$

$$41. 3 \cos x = \cos x - 1$$

$$2 \cos x = -1$$

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

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

$$43. \sin^2 x = 1 - \cos x$$

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

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

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

$$\cos x = 0 \quad \cos x = 1$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2} \quad x = 0$$

$$45. \cos 15^\circ = \cos\left(\frac{30^\circ}{2}\right)$$

$$= + \sqrt{\frac{1 + \cos 30^\circ}{2}}$$

$$= + \sqrt{\frac{1 + \frac{\sqrt{3}}{2}}{2}}$$

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

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

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

$$47. \tan \frac{13\pi}{12} = \tan\left(\frac{16\pi}{12} - \frac{3\pi}{12}\right)$$

$$= \tan\left(\frac{4\pi}{3} - \frac{\pi}{4}\right)$$

$$= \frac{\tan \frac{4\pi}{3} - \tan \frac{\pi}{4}}{1 + \tan \frac{4\pi}{3} \tan \frac{\pi}{4}}$$

$$= \frac{\sqrt{3} - 1}{1 + \sqrt{3}} \cdot \frac{1 - \sqrt{3}}{1 - \sqrt{3}}$$

$$= \frac{-3 - 1 + 2\sqrt{3}}{1 - 3}$$

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

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

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

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

$$49. \cos -\frac{11\pi}{12}$$

$$= \cos \frac{11\pi}{12}$$

$$= \cos\left(\frac{14\pi}{12} - \frac{3\pi}{12}\right)$$

$$= \cos\left(\frac{7\pi}{6} - \pi\right)$$

$$= \cos \frac{7\pi}{6} \cos \frac{\pi}{4} + \sin \frac{7\pi}{6} \sin \frac{\pi}{4}$$

$$= -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + -\frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

$$= -\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4}$$

$$= -\frac{\sqrt{6} + \sqrt{2}}{4}$$

$$51. \frac{\tan \frac{\pi}{9} + \tan \frac{8\pi}{9}}{1 - \tan \frac{\pi}{9} \tan \frac{8\pi}{9}}$$

$$= \tan\left(\frac{\pi}{9} + \frac{8\pi}{9}\right)$$

$$= \tan\left(\frac{9\pi}{9}\right)$$

$$= \tan \pi = 0$$

$$= \tan \pi = 0$$

$$53. \sin 95^\circ \cos 50^\circ - \cos 95^\circ \sin 50^\circ$$

$$= \sin(95^\circ - 50^\circ)$$

$$= \sin(45^\circ)$$

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

$$55. \cos(\theta + 30^\circ) - \sin(\theta + 60^\circ) = -\sin \theta$$

$$\cos \theta \cos 30^\circ - \sin \theta \sin 30^\circ - (\sin \theta \cos 60^\circ + \cos \theta \sin 60^\circ)$$

$$\cos \theta \cos 30^\circ - \sin \theta \sin 30^\circ - \sin \theta \cos 60^\circ - \cos \theta \sin 60^\circ$$

$$\cos \theta \frac{\sqrt{3}}{2} - \sin \theta \frac{1}{2} - \sin \theta \frac{1}{2} - \cos \theta \frac{\sqrt{3}}{2}$$

$$-\frac{1}{2} \sin \theta - \frac{1}{2} \sin \theta$$

$$= -\sin \theta \quad \checkmark$$

$$57. \cos\left(\theta - \frac{\pi}{3}\right) + \cos\left(\theta + \frac{\pi}{3}\right) = \cos\theta$$

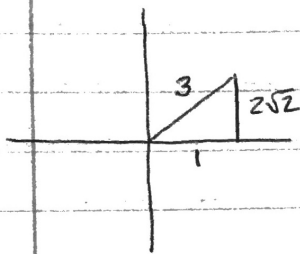
$$\cos\theta \cos \frac{\pi}{3} + \sin\theta \sin \frac{\pi}{3} + \cos\theta \cos \frac{\pi}{3} - \sin\theta \sin \frac{\pi}{3}$$

$$2\cos\theta \cos \frac{\pi}{3}$$

$$2\cos\theta \cdot \frac{1}{2}$$

$$\cos\theta \quad \checkmark$$

$$59. \cos\theta = \frac{1}{3}$$



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

$$= 2\left(\frac{1}{3}\right)^2 - 1$$

$$= \frac{2}{9} - 1 = \frac{-7}{9}$$

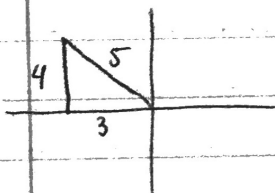
$$\tan 2\theta = \frac{\frac{4\sqrt{2}}{9}}{\frac{-7}{9}} = \frac{-4\sqrt{2}}{7}$$

$$\sin 2\theta = 2\sin\theta \cos\theta$$

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

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

$$61. \sin\theta = \frac{4}{5}$$



$$\sin 2\theta = 2\sin\theta \cos\theta$$

$$= 2\left(\frac{4}{5}\right)\left(\frac{3}{5}\right)$$

$$= \frac{24}{25}$$

$$\tan 2\theta = \frac{\frac{24}{25}}{\frac{-7}{25}} = \frac{-24}{7}$$

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

$$= 2\left(\frac{3}{5}\right)^2 - 1$$

$$= \frac{18}{25} - 1 = \frac{-7}{25}$$

$$63. \sin 75^\circ = \sin(30^\circ + 45^\circ)$$

$$= \sin 30^\circ \cos 45^\circ + \cos 30^\circ \sin 45^\circ$$

$$= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{1}{2}$$

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

$$67. \sin \frac{15\pi}{8} = \sin\left(\frac{15\pi}{4} - \frac{\pi}{2}\right)$$

$$= -\sqrt{\frac{1 - \cos \frac{15\pi}{4}}{2}}$$

$$= -\sqrt{\frac{1 - \frac{\sqrt{2}}{2}}{2}}$$

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

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

$$65. \tan 67.5^\circ = \tan \frac{135^\circ}{2}$$

$$= \frac{1 - \cos 135^\circ}{\sin 135^\circ}$$

$$= \frac{1 - \frac{-\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}$$

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

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

$$= \frac{2 + \sqrt{2}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{2\sqrt{2} + 2}{2} = \sqrt{2} + 1$$