

Chapter 5 Review Solutions

9.

$$\begin{aligned} \frac{\csc \alpha + \sec \alpha}{\sin \alpha + \cos \alpha} &= \cot \alpha + \tan \alpha \\ \frac{1}{\sin \alpha} + \frac{1}{\cos \alpha} &= \\ \frac{\cos \alpha + \sin \alpha}{\sin \alpha \cos \alpha} &= \\ \frac{\cos \alpha + \sin \alpha}{\sin \alpha \cos \alpha} \cdot \frac{1}{\sin \alpha + \cos \alpha} &= \\ \frac{1}{\sin \alpha \cos \alpha} &= \\ \frac{\cos^2 \alpha + \sin^2 \alpha}{\sin \alpha \cos \alpha} &= \\ \frac{\cos^2 \alpha}{\sin \alpha \cos \alpha} + \frac{\sin^2 \alpha}{\sin \alpha \cos \alpha} &= \\ \frac{\cos \alpha}{\sin \alpha} + \frac{\sin \alpha}{\cos \alpha} &= \cot \alpha + \tan \alpha \end{aligned}$$

13.

$$\begin{aligned} &\sin^4 x \tan^2 x \\ &\sin^2 x \sin^2 x \tan^2 x \\ &\left(\frac{1 - \cos 2x}{2}\right) \left(\frac{1 - \cos 2x}{2}\right) \left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) \\ &\left(\frac{1 - 2 \cos 2x + \cos^2 2x}{4}\right) \left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) \\ &\left(\frac{1 - 2 \cos 2x + \left(\frac{1 + \cos 4x}{2}\right)}{4}\right) \left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) \\ &\left(\frac{2 - 4 \cos 2x + 1 + \cos 4x}{8}\right) \left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) \\ &\left(\frac{3 - 4 \cos 2x + \cos 4x}{8}\right) \left(\frac{1 - \cos 2x}{1 + \cos 2x}\right) \\ &\frac{3 - 3 \cos 2x - 4 \cos 2x + 4 \cos^2 2x + \cos 4x - \cos 2x \cos 4x}{8 + 8 \cos 2x} \\ &\frac{3 - 7 \cos 2x + 4 \left(\frac{1 + \cos 4x}{2}\right) + \cos 4x - \cos 2x \cos 4x}{8 + 8 \cos 2x} \\ &\frac{3 - 7 \cos 2x + 2 + 2 \cos 4x + \cos 4x - \cos 2x \cos 4x}{8 + 8 \cos 2x} \\ &\frac{5 - 7 \cos 2x + 3 \cos 4x - \cos 4x \cos 2x}{8 + 8 \cos 2x} \\ &\frac{5 - 7 \cos 2x + 3 \cos 4x - \frac{1}{2}(\cos 2x + \cos 6x)}{8 + 8 \cos 2x} \\ &\frac{10 - 14 \cos 2x + 6 \cos 4x - \cos 2x - \cos 6x}{16(1 + \cos 2x)} \\ &\frac{10 - 15 \cos 2x + 6 \cos 4x - \cos 6x}{16(1 + \cos 2x)} \end{aligned}$$

25.

$$28 \cos 10t + 38 = 28 \cos \left(10 \left(t - \frac{\pi}{6} \right) \right) + 38$$

$$\cos 10t = \cos \left(10 \left(t - \frac{\pi}{6} \right) \right)$$

$$\cos 10t = \cos \left(10t - \frac{10\pi}{6} \right)$$

$$\cos 10t - \cos \left(10t - \frac{5\pi}{3} \right) = 0$$

$$-2 \sin \left(\frac{10t + \left(10t - \frac{5\pi}{3} \right)}{2} \right) \sin \left(\frac{10t - \left(10t - \frac{5\pi}{3} \right)}{2} \right) = 0$$

$$\sin \left(\frac{20t - \frac{5\pi}{3}}{2} \right) \sin \frac{5\pi}{3} = 0$$

$$\sin \left(10t - \frac{5\pi}{6} \right) \cdot \frac{1}{2} = 0$$

$$\sin \left(10t - \frac{5\pi}{6} \right) = 0$$

$$10t - \frac{5\pi}{6} = 0 + n\pi$$

$$10t = \frac{5\pi}{6} + n\pi$$

$$t = \frac{5\pi}{60} + \frac{n\pi}{10}$$

$$t = \frac{\pi}{12} + \frac{n\pi}{10}$$