SM3H 8.2 Proving Trig. Identities (key-selected answers)

When proving identities you must show each step!

1. $-\cos^2 x$ or $\sin^2 x - 1$

3. $\csc^2 x + 2 + \sin^2 x$

5. $(\sin \alpha - 3)(2\sin \alpha + 1)$

7. $\sin x (\sin x - 4)$

9. $(\tan x - 4)(\tan x - 2)$

11. $(1 + \cos x)(1 - \cos x)$

13.

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

17.

$$\tan(\theta)\cos(\theta) + \csc(\theta)\sin^2(\theta) = 2\sin(\theta)$$

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

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

$$2\sin(\theta) = 2\sin(\theta) \; \Delta$$

21.

$$\frac{\csc x + 1}{\csc x - 1} = \frac{1 + \sin x}{1 - \sin x}$$

$$\frac{\frac{1}{\sin x} + 1}{\frac{1}{\sin x} - 1} \cdot \frac{\sin x}{\sin x} = \frac{1 + \sin x}{1 - \sin x}$$

$$\frac{1 + \sin x}{1 - \sin x} = \frac{1 + \sin x}{1 - \sin x} \; \Delta$$

23a. $\frac{\sqrt{2}}{2}$

23b. $\frac{2\sqrt{3}}{3}$

23c. undefined

24. Amp: 3, phase shift: right π/2, period: 2π/5, freq: 5/2π, range: [4, 10]