

Unscrambling Identities

Verifying Trig Identities

Directions:

1. Cut the strips apart.
2. Unscramble the steps to correctly verify the identity.
3. Copy the steps onto your notebook paper (writing one step per line).
4. Next to each step of the verification, explain in words which basic trig identity was used.

1. Verify the identity:

$$\sin x \left(\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} \right) = 2$$

$$\frac{1 - \cos^2 x}{1 - \cos x} + 1 - \cos x$$

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

$$\sin x \left(\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} \right)$$

$$\frac{(1 + \cos x)(1 - \cos x)}{1 - \cos x} + 1 - \cos x$$

$$2$$

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

2. Verify the identity:

$$\sec x \csc^2 x - \csc^2 x = \frac{\sec x}{1 + \cos x}$$

$$\frac{1}{\sin^2 x} \left(\frac{1}{\cos x} - 1 \right)$$

$$\frac{1}{(1 + \cos x) \cos x}$$

$$\frac{\sec x}{1 + \cos x}$$

$$\frac{1}{1 - \cos^2 x} \left(\frac{1 - \cos x}{\cos x} \right)$$

$$\csc^2 x (\sec x - 1)$$

$$\frac{1}{(1 + \cos x)(1 - \cos x)} \left(\frac{1 - \cos x}{\cos x} \right)$$

$$\sec x \csc^2 x - \csc^2 x$$

$$\frac{1}{\sin^2 x} \left(\frac{1 - \cos x}{\cos x} \right)$$

3. Verify the identity:

$$\frac{\cos x + \tan x}{\sin x} = \cot x + \sec x$$

$$\cot x + \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}$$

$$\cot x + \sec x$$

$$\frac{\cos x}{\sin x} + \frac{\tan x}{\sin x}$$

$$\cot x + \frac{1}{\cos x}$$

$$\cot x + \frac{\left(\frac{\sin x}{\cos x} \right)}{\sin x}$$

$$\frac{\cos x + \tan x}{\sin x}$$