

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

c.  $\rightarrow$

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

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

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

$$b. \quad 1 + \cos x + 1 - \cos x$$

$$e. \quad 2 \quad \checkmark$$

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

g.  $\rightarrow$

$$e. \quad \csc^2 x (\sec x - 1)$$

$$a. \quad \frac{1}{\sin^2 x} \left( \frac{1}{\cos x} - 1 \right) \quad \text{mult. by } \cos x$$

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

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

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

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

$$3. \frac{\cos x + \tan x}{\sin x} = \cot x + \sec x$$

f.  $\rightarrow$

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

$$e. \cot x + \frac{\sin x / \cos x}{\sin x}$$

$$a. \cot x + \frac{\sin x}{\cos x}, \frac{1}{\sin x}$$

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

$$b. \cot x + \sec x \quad \checkmark$$

fy the identity:

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

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

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

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

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

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

2. Verify the identity:

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

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

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

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

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

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

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

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

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

fy the identity:

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

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

$$\cot x + \sec x$$

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

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

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

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