

Section 4.1

#9.

$$\frac{\sin(x) * \sec(x)}{\tan(x)} = \frac{\sin(x) * 1/\cos(x)}{\sin(x) / \cos(x)} = \frac{\sin(x) / \cos(x)}{\sin(x) / \cos(x)} = 1$$

#11.

$$\frac{1 + \cos(x)}{1 + \sec(x)} = \frac{1 + \cos(x)}{1 + 1/\cos(x)} = \frac{(1 + \cos(x)) \cos(x)}{(1 + 1/\cos(x)) \cos(x)} = \frac{(1 + \cos(x)) \cos(x)}{(\cos(x) + 1)} = \cos(x)$$

#15.

$$\frac{1 + \csc(x)}{\cos(x) + \cot(x)} = \frac{1 + 1/\sin(x)}{\cos(x) + \cos(x)/\sin(x)} = \frac{(1 + 1/\sin(x)) \sin(x)}{(\cos(x) + \cos(x)/\sin(x)) \sin(x)} =$$

$$\frac{(\sin(x) + 1)}{(\cos(x) \sin(x) + \cos(x))} = \frac{(\sin(x) + 1)}{(\cos(x) (\sin(x) + 1))} = \frac{1}{\cos(x)} = \sec(x)$$

#29.

$$\sin(B) + \cos(B) \cot(B) = \sin(B) + \cos(B) \cos(B) / \sin(B) = \sin^2(B) / \sin(B) + \cos^2(B) / \sin(B) =$$

$$(\sin^2(B) + \cos^2(B)) / \sin(B) = 1 / \sin(B) = \csc(B)$$

#33.

$$\tan(x) + \cot(x) = \frac{\sin(x)}{\cos(x)} + \frac{\cos(x)}{\sin(x)} = \frac{\sin^2(x)}{\sin(x) \cos(x)} + \frac{\cos^2(x)}{\sin(x) \cos(x)} =$$

$$\frac{\sin^2(x) + \cos^2(x)}{\sin(x) \cos(x)} = \frac{1}{\sin(x) \cos(x)} = \sec(x) \csc(x)$$

#45.

$$(1 - \cos^2 x)(1 + \cot^2 x) = \sin^2 x \csc^2 x = (\sin x \csc x)^2 = 1$$

#49.

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

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

#57.

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

#73.

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