

**Chapter 3 – Worksheet 3 – 2****Prove that each equation is an identity.**

1)  $\tan x \left( \frac{1}{\cot x} \right) = \tan^2 x$

2)  $(1 - \cos \beta)(1 + \cos \beta) = \sin^2 \beta$

3)  $\cos^2 x (\csc x)(\sec x) = \cot x$

4)  $(1 - \cos^2 \alpha)(\cot \alpha) = \sin \alpha \cos \alpha$

5)  $\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} = \frac{\csc x}{\cos x}$

6)  $\cot x (\tan x \sin x + \cos x) = \csc x$

7)  $\frac{1 + \sin x}{\cos x} = \frac{\cos x}{1 - \sin x}$

8)  $\frac{\sec^2 x - 1}{\sin^2 x} = \sec^2 x$

**Factor completely.**

9)  $x^2 + 12x + 36$

10)  $x^2 - 8x + 16$

11)  $x^3 - x$

12)  $y^3 + 27$

13)  $14x^2 + 35xy$

14)  $x^2 - 3x - 4$

15)  $2x^2 + 13x + 15$

16)  $9y^2 - 24y + 16$

**Recall:**

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$