Name:_____

5.1 Worksheet: In order to get full credit, you need 40 points.

Triangle Problems (1 point each)

1. Let $\cot\theta = \frac{7}{5}$ and $\sin\theta < 0$. Find the values of the following

   a. $\cos\theta =$ _____ b. $\csc\theta =$ _____

2. Let $\cos\theta = -\frac{2}{9}$ and $\tan\theta < 0$. Find the values of the following

   a. $\sin\theta =$ _____ b. $\cot\theta =$ _____

Trigonometric Substitution (3 points each): Write the following algebraic expressions as trig functions of θ using the following.

1. Use $x = \sin\theta$
   $\sqrt{1-x^2}$ =

2. Use $x = 2\cot\theta$
   $\sqrt{4+x^2}$ =

3. Use $x = 2\cos\theta$
   $\sqrt{4-x^2}$ =

4. Use $x = 3\sec\theta$
   $\sqrt{x^2-9}$ =

5. Use $x = 4\sin\theta$
   $\sqrt{16-x^2}$ =

6. Use $x = 4\csc\theta$
   $\sqrt{x^2-16}$ =

7. Use $x = 5\sec\theta$
   $\sqrt{x^2-25}$ =

8. Use $x = 5\cos\theta$
   $\sqrt{25-x^2}$ =

9. Use $x = 10\tan\theta$
   $\sqrt{x^2+100}$ =

10. Use $x = \sin\theta$
    $\sqrt{1-x^{14}}$ =

Simplifying Using Identities (3 points each)

1. $\dfrac{1-\cos^2 t}{\sin^2 t}$

2. $\dfrac{\tan^2 x+1}{1+\cot^2 x}$

3. $\dfrac{\tan^2 x}{1-\sec^2 x}$

4. $\tan^2 x\,(\csc^2 x - 1)$

5. $\dfrac{\tan x+\cot x}{\cot x}$

6. $\cot x\,(\tan x + \cot x)$

7. $\dfrac{1}{\sec x-\tan x}-\dfrac{1}{\sec x+\tan x}$

8. $\dfrac{\cos^2 x}{1-\cos^2 x}$

9. $\dfrac{\sec^2 x-1}{\tan x}$

10. $\dfrac{\cos^2 x-1}{\sin^2 x-1}$

11. $\dfrac{\tan x}{\tan x+\cot x}$

12. $\dfrac{\cot^2 x\cos^2 x}{\cot^2 x-\cos^2 x}$

13. $\dfrac{\tan x-\tan x\sin^2 x}{2\sin x\cos x}$

Simplifying Using Factoring (2 points each)

1. $\csc^2 x - \cot x - 3$

2. $\cot^2 x - \cot^2 x \cos^2 x$

3. $\tan^2 x-16$

4. $3\cos^2 x-4\cos x-4$

5. $25\sin^2 x-9$

6. $\sin^2 x-2\sin x+1$