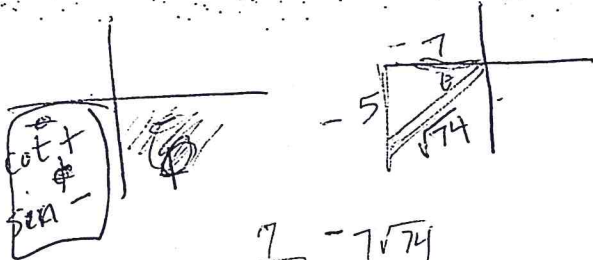


Name: _____

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

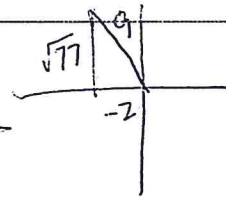
$\tan \theta = \frac{5}{7}$



$\frac{49}{25}$
 $\frac{74}{74}$ 2.37

a. $\cos \theta = \frac{7}{\sqrt{74}} = \frac{7\sqrt{74}}{74}$ b. $\csc \theta = \frac{\sqrt{74}}{-5}$

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



$4 + 77 = 81$

a. $\sin \theta = \frac{\sqrt{77}}{9}$ b. $\cot \theta = \frac{-2}{\sqrt{77}} = \frac{-2\sqrt{77}}{77}$

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

1. Use $x = \sin \theta$

$\sqrt{1-x^2} =$

$\sqrt{1-\sin^2 \theta}$

$\sqrt{\cos^2 \theta}$
 $\cos \theta$

2. Use $x = 2 \cot \theta$

$\sqrt{4+x^2} =$

$\sqrt{4+(2\cot \theta)^2}$
 $\sqrt{4+4\cot^2 \theta} = \sqrt{4(1+\cot^2 \theta)}$
 $= \sqrt{4(\csc^2 \theta)} =$

$2 \csc \theta$

3. Use $x = 2 \cos \theta$

$\sqrt{4-x^2} =$

$\sqrt{4-(2\cos \theta)^2}$

$\sqrt{4-4\cos^2 \theta}$

$\sqrt{4(1-\cos^2 \theta)}$

$2 \sin \theta$

4. Use $x = 3 \sec \theta$

$\sqrt{x^2-9} =$

$\sqrt{(3\sec \theta)^2-9}$

$\sqrt{9\sec^2 \theta-9}$

$\sqrt{9(\sec^2 \theta-1)} = \sqrt{9\tan^2 \theta}$

$3 \tan \theta$

5. Use $x = 4 \sin \theta$

$\sqrt{16-x^2} =$

$\sqrt{16-(4\sin \theta)^2}$

$\sqrt{16-16\sin^2 \theta}$

$\sqrt{16\cos^2 \theta}$

$4 \cos \theta$

6. Use $x = 4 \csc \theta$

$\sqrt{x^2-16} =$

$\sqrt{16\csc^2 \theta-16}$

$\sqrt{16(\csc^2 \theta-1)}$

$\sqrt{16\tan^2 \theta}$

$4 \tan \theta$

Simplifying Using Identities (3 points each)

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

$\frac{\sin^2 t}{\sin^2 t} = 1$

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

$\frac{\cos^2 x}{\sin^2 x} = \cot^2 x$

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

$\frac{\sec^2 x}{\csc^2 x} = \frac{\sin^2 x}{\cos^2 x} = \tan^2 x$

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

$\frac{\tan^2 x}{\tan x} = \tan x$

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

$\frac{\tan^2 x}{-\tan^2 x} = -1$

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

$\frac{-\sin^2 x}{-\cos^2 x} = \tan^2 x$

$\sec^2 x = \tan^2 x + 1$
 $1 - \tan^2 x - 1$

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

$\tan^2 x \cdot \cot^2 x = 1$

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

$\frac{\tan x}{\cot x} + 1 = \tan^2 x + 1 = \sec^2 x$

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

$\frac{\tan x \cot x + \cot^2 x}{1 + \cot^2 x} = \csc^2 x$

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

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

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

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

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

$12: 1$

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

$\frac{\frac{\sin x}{\cos x} - \frac{\sin x}{\cos x} \cdot \frac{\sin^2 x}{\cos^2 x}}{2 \sin x \cos x} = \frac{\frac{\sin x (1 - \sin^2 x)}{\cos^3 x}}{2 \sin x \cos x} = \frac{\sin^2 x}{2 \cos^2 x}$

Simplifying Using Factoring (2 points each)

1. $\csc^2 x - \cot x - 3$
 $1 + \cot^2 x - \cot x - 3$
 $\cot^2 x - \cot x - 2$
 $(\cot x - 2)(\cot x + 1)$

2. $\cot^2 x - \cot^2 x \cos^2 x$
 $\cot^2 x (1 - \cos^2 x)$
 $\cot^2 x \cdot \sin^2 x = \cos^2 x$

3. $\tan^2 x - 16$
 $(\tan x + 4)(\tan x - 4)$

4. $3 \cos^2 x - 4 \cos x - 4$
 $(3 \cos x + 2)(\cos x - 2)$

5. $25 \sin^2 x - 9$
 $(5 \sin x + 3)(5 \sin x - 3)$

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

13) $\frac{\sin x}{\cos x} - \frac{\sin x}{\cos x}$
 $\frac{\sin x (1 - \sin^2 x)}{\cos x} = \frac{\sin^3 x}{\cos x}$

13) $\frac{1}{2}$