Pre-Calculus
Intro to Unit 8

Name: _____

Algebra Review
Factor:

1. $x^2 - 1$
Diff of perfect □s
$(x+1)(x-1)$

2. $x^2 - 2x + 1$
-1×-1, 1, -2
$(x-1)(x-1)$

3. $4x^2 - 4x + 1$
-2×-2, 4, -4
Long abc
$4x^2 - 2x - 2x + 1$
$2x(2x-1) - 1(2x-1)$
$(2x-1)(2x-1)$

4. $x^3z^2 - x^2y^2$
GCF
$x^2(xz^2 - y^2)$
That's it!

5. $1 - x^2$
Diff of perfect □s
$(1-x)(1+x)$

6. $x^2 + 2x + 1$
1×1, 1, 2
$(x+1)(x+1)$

7. $x^2 - y^2$
diff of perfect □'s
$(x-y)(x+y)$

8. $x^2 + 4x - 5$
$+5 \times -1$, -5, 4
$(x+5)(x-1)$
Short abc

Solve by factoring:

9. $x^2 - 5x = 0$ GCF
$x(x-5) = 0$
$x = 0 \quad x = 5$

10. $x^2 - 5x = 14$
$x^2 - 5x - 14 = 0$
$(x-7)(x+2) = 0$
$x = 7 \quad x = -2$

Simplify:

11. $\frac{3}{4/5} = 3 \div \frac{4}{5}$
$= 3 \cdot \frac{5}{4} = \frac{15}{4}$

12. $\frac{\frac{3}{10}}{\frac{4}{5}}$
$\frac{3}{10} \div \frac{4}{5}$
$\frac{3}{10} \cdot \frac{5}{4} = \frac{15}{40} = \frac{3}{8}$

13. Simplify into two factions: $\frac{x^2+2}{x} = \frac{x^2}{x} + \frac{2}{x}$

Add/SubtractFractions:

14. $\frac{2}{x+1} - \frac{3}{x-1}$ Get common denominators
$\frac{2(x-1)}{(x+1)(x-1)} - \frac{3(x+1)}{(x+1)(x-1)}$
$\frac{2(x-1) - 3(x+1)}{(x+1)(x-1)} = \frac{2x-2-3x-3}{(x+1)(x-1)} = \frac{-x-5}{(x+1)(x-1)}$

15. $\frac{x}{x+2} + \frac{4}{x-1}$
$\frac{x(x-1)}{(x+2)(x-1)} + \frac{4}{(x+2)(x-1)} = \frac{x(x-1)+4}{(x+2)(x-1)}$
$\frac{x^2 - x + 4}{(x+2)(x-1)}$

Simplifying Expressions Using Trig Identities

Part 1: Use your calculator to complete the following investigation.

Evalute part a. by putting $\sin\left(\frac{\pi}{16}\right)$ into your calculator and then square your answer. Once you have done that store that number in A. Do the same thing for part b. but store the number in B. In part c. add A and B together.

1.a. $\sin\left(\frac{\pi}{16}\right) =$ .1951 $\left(\sin\left(\frac{\pi}{16}\right)\right)^2 =$ .0381 2.a. $\sin .87 =$ .7643 $(\sin .87)^2 =$ .5842

1.b. $\cos\left(\frac{\pi}{16}\right) =$ .9808 $\left(\cos\left(\frac{\pi}{16}\right)\right)^2 =$ .9619 2.b. $\cos .87 =$ .6448 $(\cos .87)^2 =$ .4158

1. c. $\left(\sin\left(\frac{\pi}{16}\right)\right)^2 + \left(\cos\left(\frac{\pi}{16}\right)\right)^2 =$ 1 2. c. $(\sin .87)^2 + (\cos .87)^2 =$ 1

3. Plug in any number for θ in the following and what do you notice?

$(\sin\theta)^2 + (\cos\theta)^2 =$ 1

*Note: $(\sin\theta)^2 + (\cos\theta)^2$ is actually written as $\sin^2 x + \cos^2 x$ in real life.

Part 2: Simplifying an expression using what we just found out.

Graph the following... be sure to use parenthesis to help the calculator out.

1.a. $\tan x \sin^2 x + \tan x \cos^2 x = y$

1.b. What do you notice about the graph? What does it look like?

It still looks like tangent.

1.c. Simplify $\tan x \sin^2 x + \tan x \cos^2 x$ by factoring out $\tan x$.

$\tan x (\sin^2 x + \cos^2 x) = y$

Now what else can you simplify using what you learned in section 1 #3?

$y = \tan(x)$

So... $\tan x \sin^2 x + \tan x \cos^2 x =$ $\tan(x)$

1.d. Reflect on the connections you saw in Part 2: