TANGENT INVESTIGATION -- Just More Fun!!!!! Name

1. Put your graphing calculator into radian mode. Set the domain: $0 < x < \pi$, the range: $-10 < y < 10$, and the scale = 1.

a) Graph $y = \tan x$. Sketch what you see.

What function does this look similar to? _____

b) Now change the domain: $-\pi < x < \pi$. Graph $y = \tan x$ again and sketch what you see.

What function does this look similar to? _____

c) What's going on here?? Is $y = \tan x$ the same as $y = x^3$ or $y = {}^1/_x$???? Make the domain larger so that you can see what $y = \tan x$ really looks like. Set domain: $-2\pi < x < 2\pi$ and range: $-8 < y < 8$

Graph $y = \tan x$ and $y = x^3$ simultaneously. Are they the same curve?_____

Describe similarities and differences.

d) $y = \tan x$ is another trig function. It is cyclic and it is periodic, however, it does not have the same period as the sin and cos function. What is the period of $y = \tan x$? _____

2. If you remember, $\tan x = {}^{\text{opposite leg}}/_{\text{adjacent leg}}$. In our unit circle, this means $\tan x = {}^{\sin x}/_{\cos x}$. Since we can not divide by zero (have zero in the denominator), the graph of $y = \tan x$ has asymptotes every place that $\cos x = 0$. Look at the graph of $y = \tan x$. For what values of x does $y = \tan x$ have asymptotes?

3. Set the domain: $-2\pi < x < 2\pi$,with a scale = $\frac{\pi}{2}$ and range $-4 < y < 4$ with a scale = 1.

a) Graph $y = \sin x$, $y = \cos x$, and $y = \tan x$. Sketch each one on a separate grid.

b) Graph the following combinations of these functions and sketch your results on the attached grids.

1) $y = \cos x + \sin x$

2) $y = \sin x / \cos x$

3) $y = 1 / \sin x$

4) $y = 1 / \tan x$

5) $y = \sin (2x)$

6) $y = 1 + \tan 2x$

7) $y = (\cos x)(\sin x)$

8) $y = \cos x / \sin x$

9) $y = x^2 + \sin (x^2)$

10) $y = \sin 2x$

11) $y = 2 (\sin x \cos x)$

12) $y = 1 / \cos 2x$

c) Make as many conjectures as you can. (ie What do you notice??)