1. Set your grapher to PARAMETRIC mode. Set $T \in [0, 2\pi]$, TSTEP = $\frac{\pi}{100}$, viewing window = $[-1.5, 1.5] \times [-1, 1]$, $X_{1T} = \cos(T)$ and $Y_{1T} = \sin(T)$.

Graph. Trace. What do you see? (Use ZSQUARE to get a better picture)

Use function evaluation (2nd CALC 1:VALUE) to find coordinates for:

$T = \frac{\pi}{6}$ : $x = \ldots, y = \ldots$

Thus $\cos(\ldots) = \ldots$ and $\sin(\ldots) = \ldots$

$T = \frac{2\pi}{3}$ : $x = \ldots, y = \ldots$

Thus $\cos(\ldots) = \ldots$ and $\sin(\ldots) = \ldots$

$T = \frac{7\pi}{3}$ : What happened? Why?

Change window settings to find $\cos(\frac{7\pi}{3})$ and $\sin(\frac{7\pi}{3})$

Thus $\cos(\frac{7\pi}{3}) = \ldots$ and $\sin(\frac{7\pi}{3}) = \ldots$

2. Write the Fundamental Trigonometric Identity: 

Suppose $\cos(t) = \frac{5}{13}$ and $\tan(t) < 0$. In which quadrant does $t$ lie? Quadrant ______

Find $\sin(t) = \ldots$

Find $\tan(t) = \ldots$ and $\sec(t) = \ldots$

Find $\cot(t) = \ldots$ and $\csc(t) = \ldots$

3. Graph the following, in PARAMETRIC and SIMULTANEOUS mode. Set $T \in [0, 2\pi]$, viewing window = $[-2, 2\pi, 1] \times [-2.5, 2.5, 1]$. Then enter $X_{1T} = -1 + \cos(t)$, $Y_{1T} = \sin(t)$ (a unit circle shifted one unit left) and $X_{2T} = t, Y_{2T} = \sin(t)$ ($y = \sin(x)$ graphed parametrically). Use ZSQUARE to get a better picture.

What do you see? (TRACE, and use up and down arrows to jump between the two curves)

For which $x$ values is $\sin(x) = 0$? _________

For which $x$ values is $\sin(x) = -1$? _________

For which $x$ values is $\sin(x) = 1$? _________

4. Suppose you are standing on level ground 250 feet away from a tall building. If the top of the building is at an angle of elevation $65^\circ$ from your current position, how tall is the building?

(Draw a picture which clearly shows all the important information)