4.5 Graphing Tangent and Cotangent

$$Tan\ \theta = \frac{\sin\theta}{\cos\theta}$$

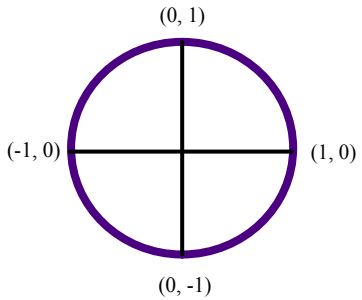
The **Periods** of $y = \tan(x)$ and $y = \cot(x)$ are π.

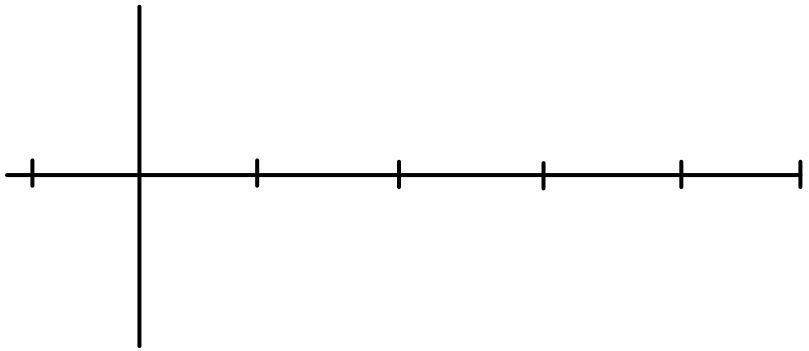
For the Tangent parent graph:

1) Graph the first ***zero*** on 0 (normal period, no phase shift).
2) Keep adding (or subtracting) the ***period*** to plot the next 2 zeros.
3) The midpoints of the zeros are **asymptotes** for tangent.

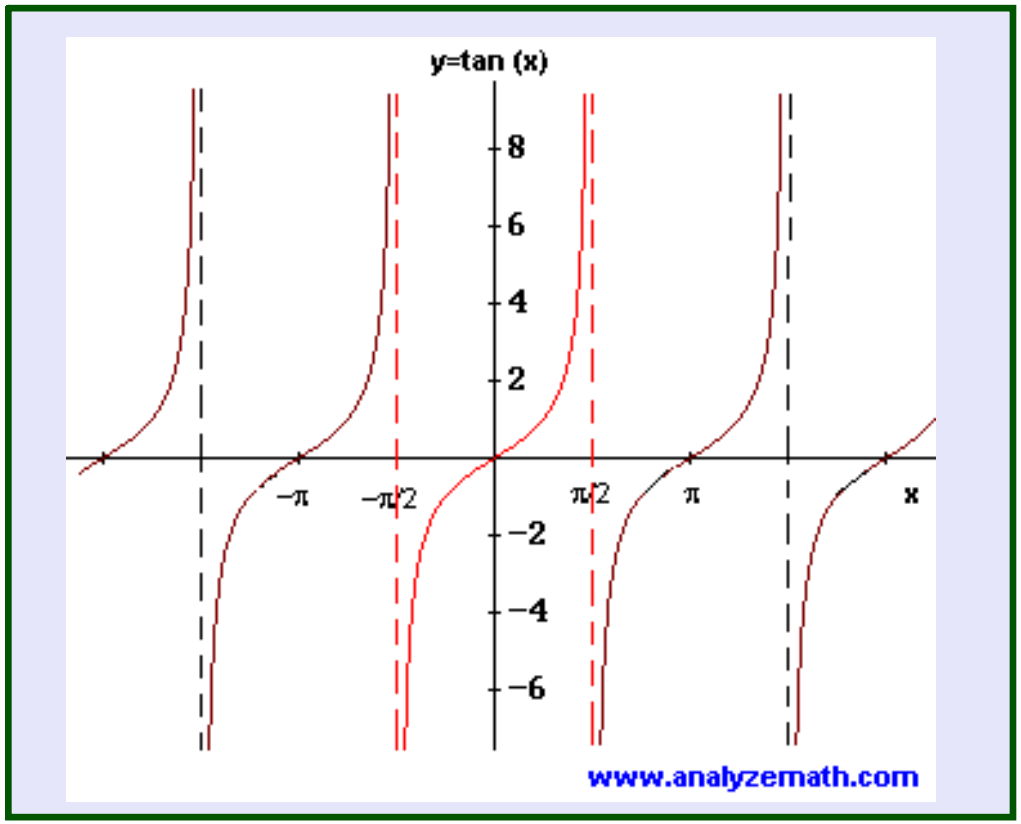
Graph by hand...

1. $y = \tan\theta$





Computer generated version...

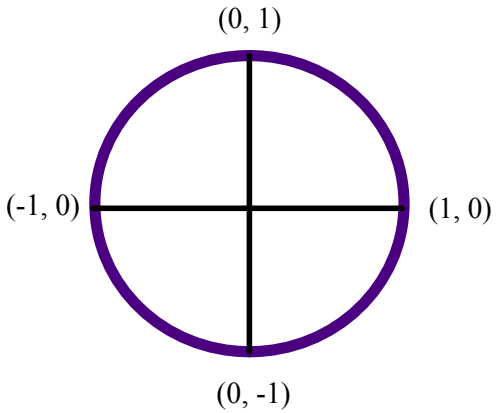


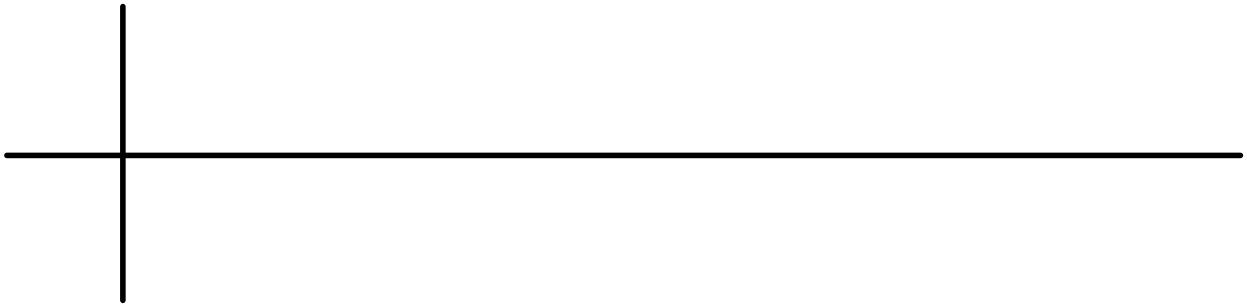
Graph this function with your graphing calculator.

Graph by hand...

2. $y = \tan\left(\frac{\theta}{2} - \frac{\pi}{6}\right)$

How can we graph this?!





$y = \tan\frac{1}{2}\left(\theta - \frac{\pi}{3}\right)$ *amplitude : none,* $Pd = \frac{\pi}{\frac{1}{2}} = 2\pi$ $P.S. = \frac{\pi}{3}$ *FIRST ZERO!*

ZEROS : $\frac{\pi}{3}, \frac{\pi}{3}$ *plus period equals next zero*

ASYMPTOTES : midpoints

$$Cot\ \theta = \frac{\cos\theta}{\sin\theta}$$

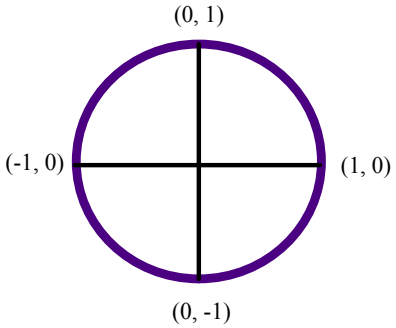
The **Periods** of $y = \tan(x)$ and $y = \cot(x)$ are π.

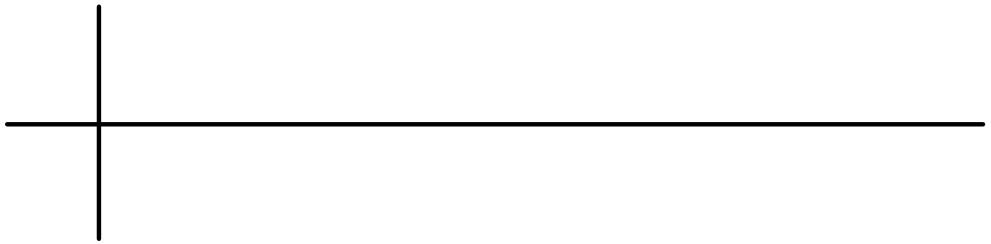
For the Cotangent parent graph:

1) Graph the first ***asymptote*** on 0 (normal period, no phase shift).
2) Keep adding (or subtracting) the ***period*** to plot the next 3 asymptotes.
3) The midpoints of the **asymptotes** are zeros for cotangent.

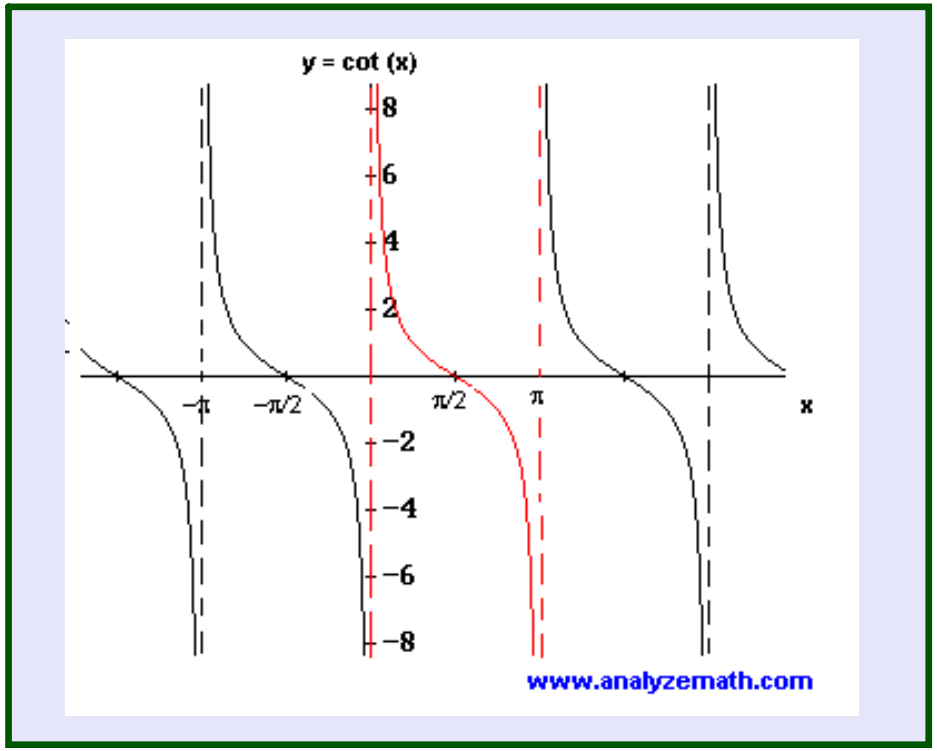
Graph by hand...

3. $y = \cot\theta$





Computer generated version....

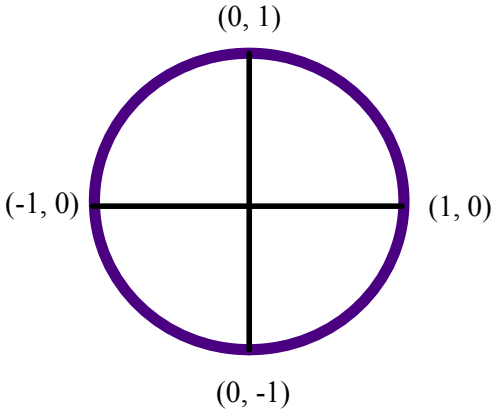


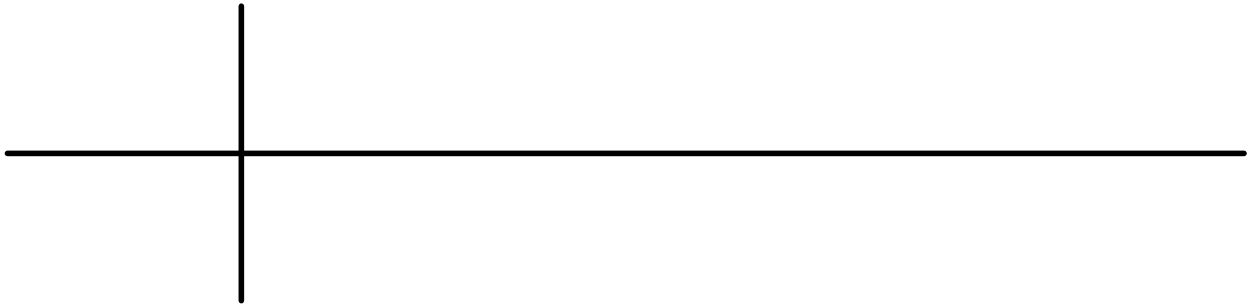
Graph this function with your graphing calculator.

Graph by hand...

4. $y = \cot\left(x + \frac{\pi}{12}\right)$

How can we graph this?!





amplitude: none, $Pd = \pi$ $P.S. = \frac{-\pi}{12}$ *FIRST ASYMPTOTE*!

ASYMPTOTES: $\frac{-\pi}{12}, \left(\text{next asymptote}: \left(\frac{-\pi}{12} + \pi = \frac{11\pi}{12}\right)\right)$

ZEROS: midpoints of asymptotes –first zero: $\left(\frac{-\pi}{12} + \frac{11\pi}{12}\right) \div 2 = \frac{5\pi}{12}$

Assignment:

W.S. #4