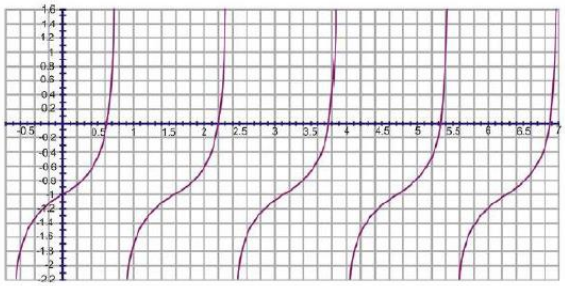
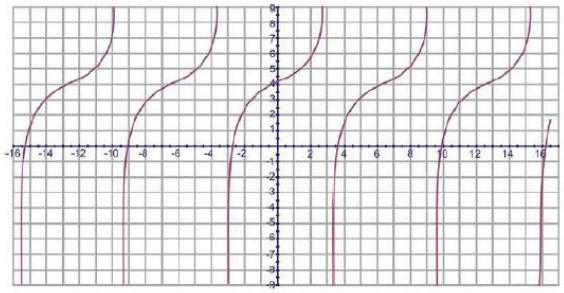
2.7 Graphing Tangent, Cotangent, Secant, and Cosecant

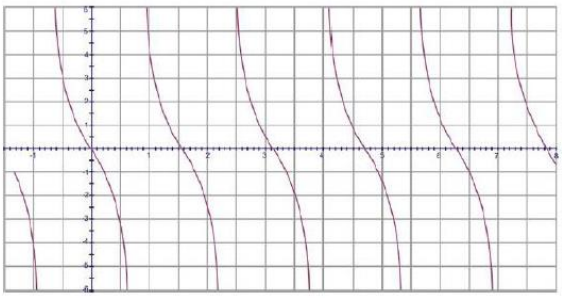
1. $y = -1 + \frac{1}{3}\cot 2x$



3. $f(x) = 4 + \tan(0.5(x - \pi))$



5. $y = -2\tan 2x$



7. To make cotangent match up with tangent, it is helpful to graph the two on the same set of axis. First, cotangent needs to be flipped, which would make the amplitude of -1. Once cotangent is flipped, it also needs a phase

9. This could be either a secant or cosecant function. We will use a cosecant model.

   - First, the vertical shift is -1.
   - The period is the difference between the two given $x-$values, $\frac{7\pi}{4} - \frac{3\pi}{4} = \pi$, so the frequency is $\frac{2\pi}{\pi} = 2$.
   - The horizontal shift incorporates the frequency, so in $y = \csc x$ the corresponding $x-$value to $\left(\frac{3\pi}{4}, 0\right)$ is $\left(\frac{\pi}{2}, 1\right)$.
   - The difference between the $x-$values is $\frac{3\pi}{4} - \frac{\pi}{2} = \frac{3\pi}{4} - \frac{2\pi}{4} = \frac{\pi}{4}$ and then multiply it by the frequency, $2 \cdot \frac{\pi}{4} = \frac{\pi}{2}$.
   - The equation is $y = -1 + \csc\left(2\left(x - \frac{\pi}{2}\right)\right)$.