

Math 150 Lecture Notes More Trigonometric Graphs

The **tangent and cotangent functions** have period π :

$$\tan(x + \pi) = \tan x \qquad \cot(x + \pi) = \cot x$$

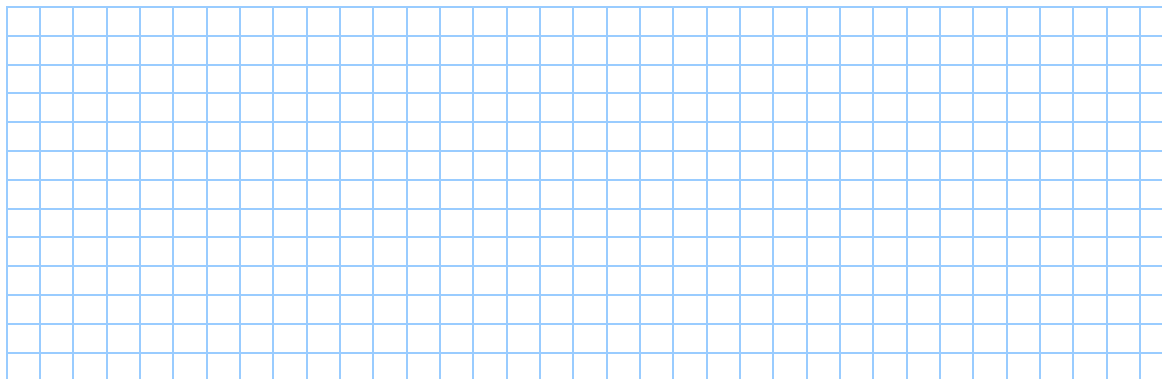
The **cosecant and secant functions** have period 2π :

$$\csc(x + 2\pi) = \csc x \qquad \sec(x + 2\pi) = \sec x$$

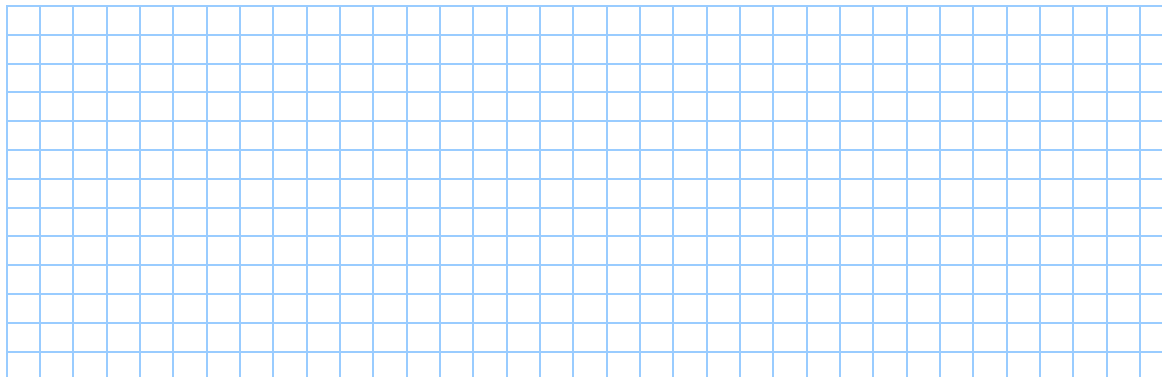
The functions $y = a \tan kx$ and $y = a \cot kx$ ($k > 0$) have period $\frac{\pi}{k}$.

The functions $y = a \csc kx$ and $y = a \sec kx$ ($k > 0$) have period $\frac{2\pi}{k}$.

Example 1: Find the period and graph the function $f(x) = -3 \sec x$



Example 2: Find the period and sketch the graph of $g(x) = 3 \csc\left(x + \frac{\pi}{2}\right)$.



Example 3: Find the period and graph the function $h(x) = \tan \frac{1}{2} \left(x + \frac{\pi}{4} \right)$.

