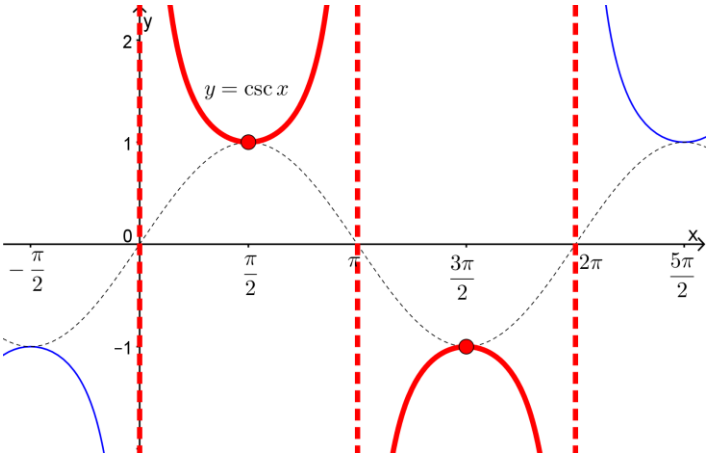
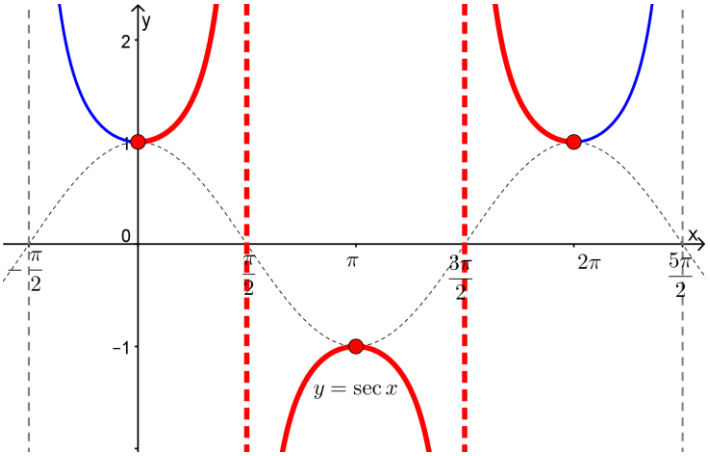
Graphs of the Secant, Cosecant, Tangent, and Cotangent Functions

Here are the graphs of $\csc x$ and $\sec x$. Remember that $\csc x = \frac{1}{\sin x}$ and $\sec x = \frac{1}{\cos x}$

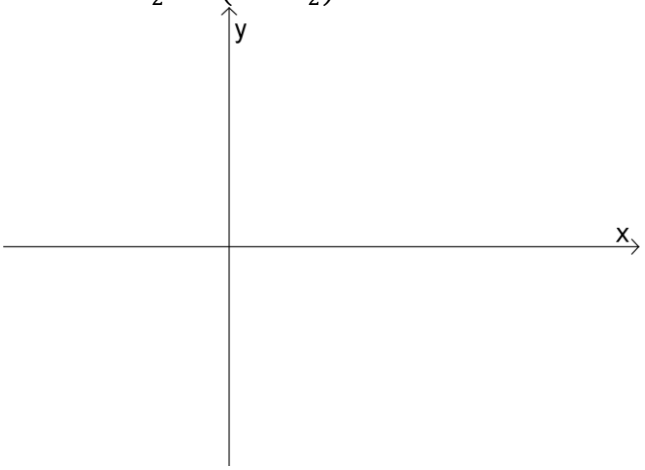




Note that the period of $\csc x$ and $\sec x$ is 2π (just like $\sin x$ and $\cos x$).

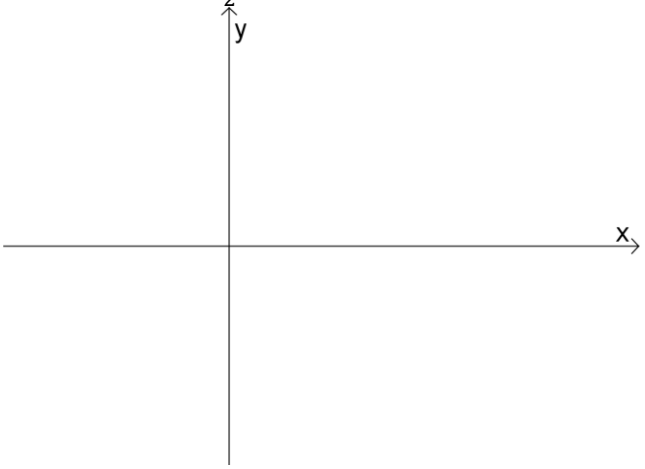
Ex 1.

Graph $y = \frac{1}{2}\csc\left(2x + \frac{\pi}{2}\right)$ over a one-period interval.

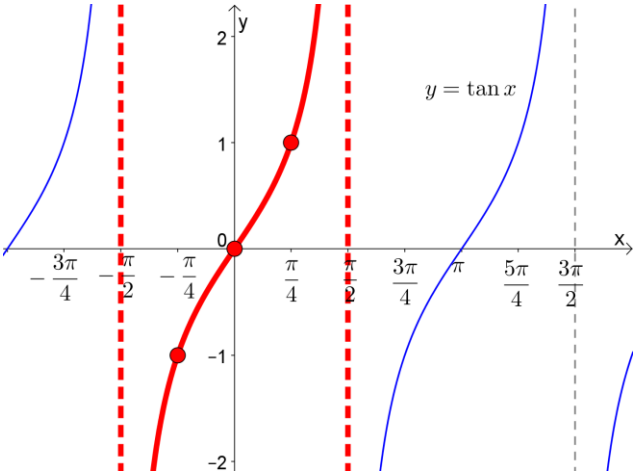


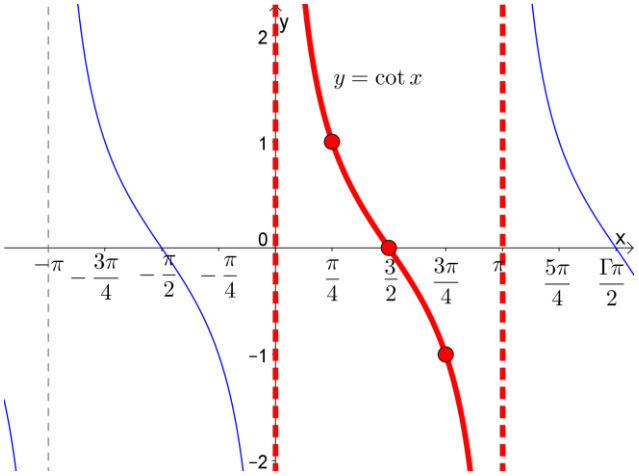
Ex 2.

Graph $y = 3\sec\frac{1}{2}x$ over a one-period interval.



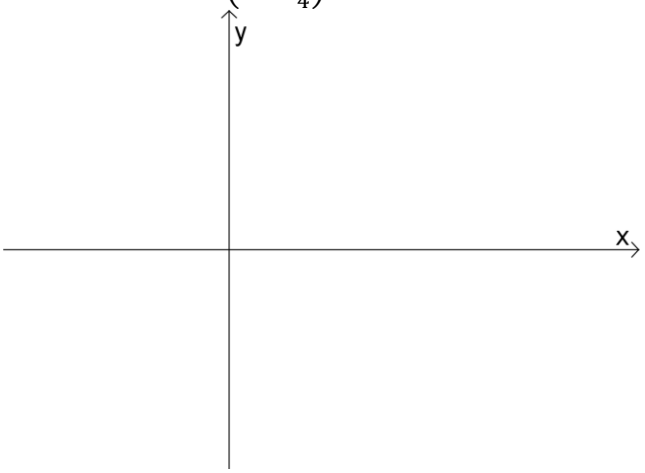
And here are the graphs of $\tan x$ and $\cot x$. Note that the period of $\tan x$ and $\cot x$ is π. Normally, we draw a period of $\tan x$ from $-\frac{\pi}{2}$ to $\frac{\pi}{2}$ and a period of $\cot x$ from 0 to π.





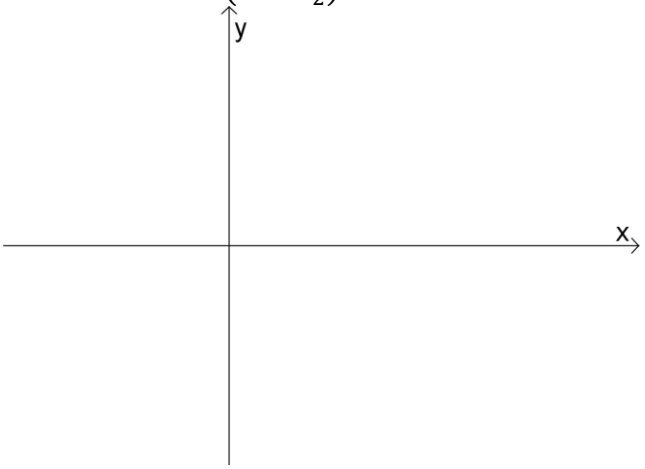
Ex 3.

Graph $y = \tan 2\left(x - \frac{\pi}{4}\right)$ over a one-period interval.



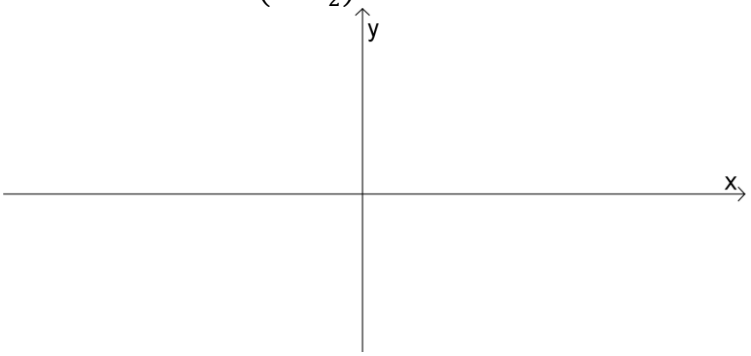
Ex 4.

Graph $y = 2\cot\left(3x - \frac{\pi}{2}\right)$ over a one-period interval.

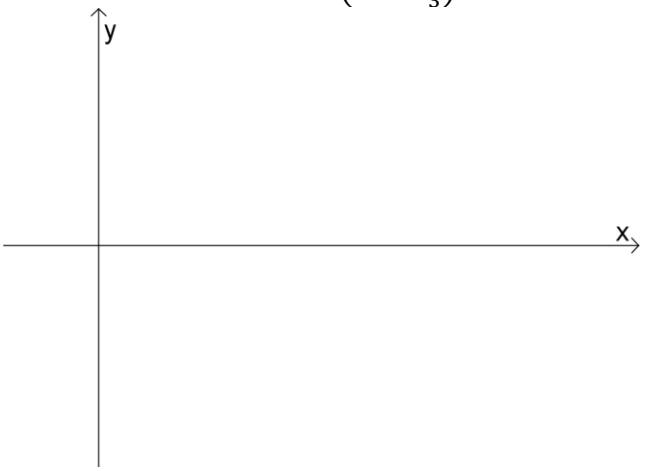


Practice

1. Graph $y = \csc 2\left(x + \frac{\pi}{2}\right)$ over a one-period interval.



2. Graph $y = -1 + 2\tan\left(2x - \frac{\pi}{3}\right)$ over a one-period interval.



Q: What comes once in a minute, twice in a moment, but never in a thousand years?