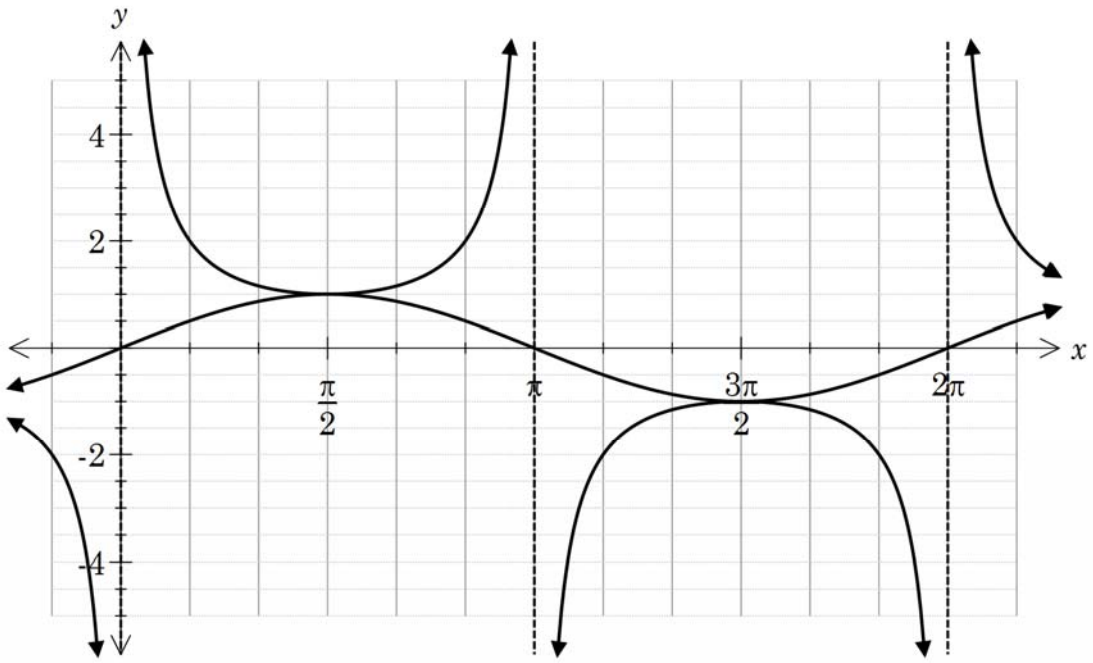
Activity 26 Cosecant and cotangent

1.



2. $\sec(\theta) = \csc\left(\theta + \frac{\pi}{2}\right)$ or similar

3.

a) $\angle TOB = \frac{\pi}{2} - \theta$

$\angle OBT = \pi - \left(\frac{\pi}{2} - \theta\right) - \frac{\pi}{2}$

$= \theta$

b) $\sin(\angle OBT) = \frac{1}{\csc(\theta)}$

$\csc(\theta) = \frac{1}{\sin(\theta)}$

c) $\tan(\angle OBT) = \frac{1}{BT}$

$BT = \frac{1}{\tan(\theta)}$

d) $\csc^2(\theta) = 1 + \left(\frac{1}{\tan(\theta)}\right)^2$

$\csc^2(\theta) = 1 + \cot^2(\theta)$

e)

$$\begin{aligned}
\text{RHS} &= 1 + \frac{1}{\tan^2(\theta)} \\
&= \frac{\tan^2(\theta) + 1}{\tan^2(\theta)} \\
&= \frac{\sec^2(\theta)}{\tan^2(\theta)} \\
&= \frac{1}{\cos^2(\theta)} \times \frac{1}{\tan^2(\theta)} \\
&= \frac{1}{\cos^2(\theta)} \times \frac{\cos^2(\theta)}{\sin^2(\theta)} \\
&= \csc^2(\theta) \\
&= \text{LHS}
\end{aligned}$$

4.