

### 3.11 Secant, Cosecant, Cotangent Functions

AP Precalculus

Name: \_\_\_\_\_

**Evaluate the following expressions. Use exact values.**

1.  $\sec\left(\frac{4\pi}{3}\right)$

2.  $\csc\left(\frac{3\pi}{2}\right)$

3.  $\cot\left(\frac{\pi}{3}\right)$

**Evaluate the following expressions. Use approximate values from calculator.**

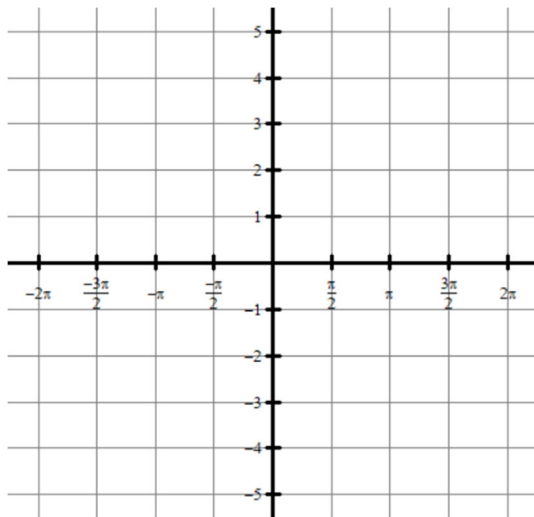
4.  $\csc(1.79)$

5.  $\sec\left(\frac{2\pi}{5}\right)$

6.  $\cot\left(\frac{4\pi}{7}\right)$

**Graph the following. State the range and all vertical asymptotes.**

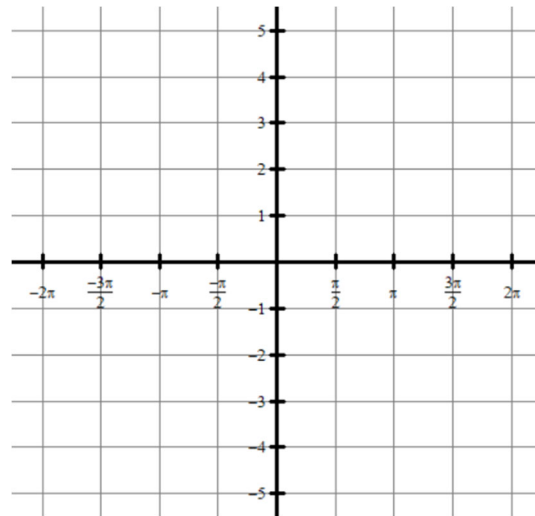
7.  $f(x) = 2\csc(x) - 1$



Range:

Vertical Asymptotes:

8.  $f(x) = 2\sec\left(\frac{1}{2}x\right)$



Range:

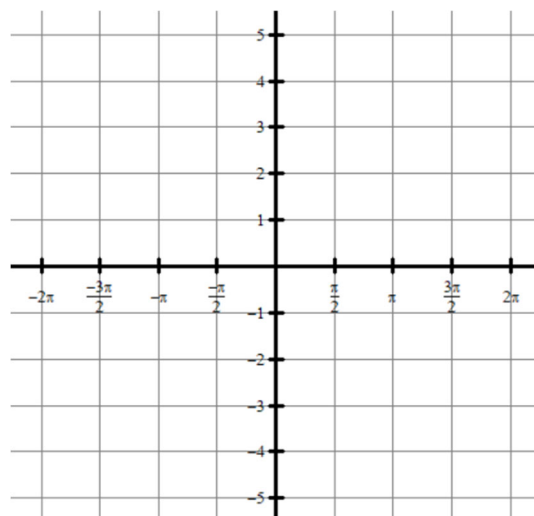
Vertical Asymptotes:

**Graph the following. State the range and all vertical asymptotes.**

9.  $f(x) = \cot(x - \pi)$

Range:

Vertical Asymptotes:



**Answers to 3.11 CA #1**

1. -2	2. -1	3. $\frac{\sqrt{3}}{3}$	
4. 1.024	5. 3.236	6. -0.228	
<p>7.</p> <p>Range: <math>(-\infty, -3] \cup [1, \infty)</math></p> <p>Vertical: <math>x = \pi n</math> where <math>n</math> is an integer</p>		<p>8.</p> <p>Range: <math>(-\infty, -2] \cup [2, \infty)</math></p> <p>Vertical: <math>x = \pi + 2\pi n</math> where <math>n</math> is an integer</p>	
<p>9.</p> <p>Range: <math>(-\infty, \infty)</math></p> <p>Vertical: <math>x = \pi n</math> where <math>n</math> is an integer</p>			