Recall, \( \sin(\theta) = \frac{\text{opp}}{\text{hyp}} \), \( \csc(\theta) = \frac{\text{hyp}}{\text{opp}} \), \( \cos(\theta) = \frac{\text{adj}}{\text{hyp}} \), and \( \sec(\theta) = \frac{\text{hyp}}{\text{adj}} \). Use this to show:

\[
\frac{1}{\sin(\theta)} = \quad \frac{1}{\cos(\theta)} =
\]

Use the above relationship to help you graph \( y = \csc(x) \).

Use the above relationship to help you graph \( y = \sec(x) \).
### Parts of a Tangent and Cotangent Graph

<table>
<thead>
<tr>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Graph Image]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vertical Stretch/Compress</strong></th>
<th>Secant and Cosecant graphs have a vertical stretch that would be equivalent to the amplitude of their reciprocal trig function.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vertical Factor</strong></td>
<td>[ \frac{(\text{Local Max } Y) - (\text{ Local Min } Y)}{2} ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Period</strong></th>
<th>The period of the graph is the horizontal distance of one complete cycle.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period</strong></td>
<td>[ (\text{ Local Min } X) - (\text{ Previous Local Min } X) ]</td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td>[ (\text{ Local Max } X) - (\text{ Previous Local Max } X) ]</td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td>[ (\text{ Asymptote } X) - (2^{nd} \text{ Previous Asymptote } X) ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Phase Shift (Secant)</strong></th>
<th>The amount the graph is shifted right/ left</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Secant Phase Shift</strong></td>
<td>[ \text{Local Min } X ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Phase Shift (Cosecant)</strong></th>
<th>The amount the graph is shifted right/ left</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cosecant Phase Shift</strong></td>
<td>[ \frac{\text{Local Min } X + \text{ Next Local Max } X}{2} ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vertical Shift</strong></th>
<th>The amount the graph is shifted up/down</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vertical Shift</strong></td>
<td>[ \frac{\text{Local Max } Y + \text{ Local Min } Y}{2} ]</td>
</tr>
</tbody>
</table>
1. Find the parameters of each SECANT/COSECANT graph and determine a possible equation.

\[ y = a \cdot \sec(b(x - c)) + d \]

\[ y = a \cdot \csc(b(x - c)) + d \]

- **a** = Vertical Stretch/Compress
- **c** = Phase Shift
- **d** = Vertical Shift
- \( \frac{2\pi}{b} = \text{Period} \)

### a.

![Graph a](image)

Possible Equation: (Using Cosecant)

### b.

![Graph b](image)

Possible Equation: (Using Cosecant)

### c.

![Graph c](image)

Possible Equation: (Using Cosecant)

### d.

![Graph d](image)

Possible Equation: (Using Cosecant)
2. Find the parameters of each **SECANT/COSECANT** graph and determine a possible equation.

a.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Cosecant)

b.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Secant)

c.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Cosecant)

d.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Secant)

e.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Secant)

f.

```
Vertical :  Period:  Phase:  Vertical:
Stretch/Compress
```

Possible Equation:
(Using Secant)
3. Find the parameters of each SECANT/COSECANT graph and determine a possible equation.

a. 

\[ y = 3 \sec(2x - 6) + 1 \]

b. 

\[ y = 0.5 \csc\left(\frac{2\pi}{3}(x + 1)\right) - 3 \]
5. Graph the following equation.
   
   a. \( y = 2 \csc\left(\frac{\pi}{2} (x - 1)\right) + 5 \)

   ![Graph of equation a]

   b. \( y = 2 \sec\left(2\left(x - \frac{\pi}{2}\right)\right) + 6 \)

   ![Graph of equation b]