

Topic: Graphing Tangent and Cotangent Functions

Essential Question:

What are the parent graphs and properties of reciprocal trig functions?



Steps -

1. Plot key points of "parent function"
(tan - cos, cot - sin)
2. Identify and draw asymptotes
3. Identify midpoints
4. Construct function
5. Identify domain and range

$$\tan(x) = \frac{\sin(x)}{\cos(x)} \quad \cot(x) = \frac{\cos(x)}{\sin(x)}$$

Remember these steps:

1. **Midline (use the vertical shift)**
2. **Amplitude (equal distance from midline)**
3. **Period**
4. **Determine scale (use $\pi/4b$ for $\tan(x)$ and $\cot(x)$)**
5. **Find five key points (start and add)**
6. **Use parent function and graph**

Let's try some more....

1. $y = 3\tan(x)$

2. $y = 2 + 4\tan(x)$

Your turn - complete on given graph

$$y = \cot(x) - 3$$

$$3. y = \cot(x/2)$$

$$4. y = \cot(x) - \frac{\pi}{3}$$

Topic: Graphing Reciprocal (sec, csc) Functions

Steps to graph:

- 1. $\sec(x)$ = use $\cos(x)$
 $\csc(x)$ = use $\sin(x)$**
- 2. Use steps #1-5 from parent function**
- 3. Plot points on graph (don't connect)**
- 4. Draw asymptotes**
- 5. Construct graph**

Let's find domain and range

$$y = 2\cot\left(\frac{\theta}{2} + \frac{\pi}{2}\right) + 2$$

Let's find domain and range

$$y = 2\csc\left(2\theta + \frac{\pi}{3}\right) - 2$$

Let's find domain and range

$$y = 2 \tan \left(2\theta - \frac{\pi}{3} \right) - 1$$

Let's find domain and range and 3 asymptotes

$$y = 3\sec\left(2\theta + \frac{3\pi}{2}\right)$$

Let's find domain and range and 3 asymptotes

$$y = \sec 2\theta - 1$$

Let's find domain and range and 3 asymptotes

$$y = 2 + \frac{1}{2} \cdot \sec\left(\frac{\theta}{2} - \frac{5\pi}{6}\right)$$

Let's find domain and range and 3 asymptotes

$$y = 2 \tan \left(\frac{\theta}{3} + \frac{\pi}{3} \right) + 1$$

