HAT 4/26/18 Name:____________________________

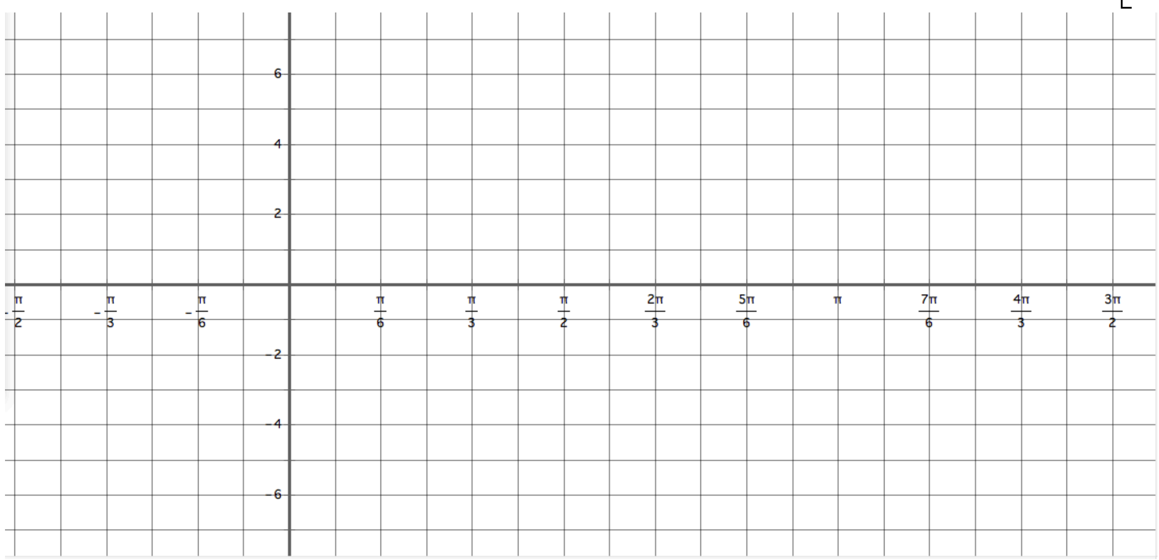
Graphing Reciprocal Functions

1) Given $f(\theta) = 3\sec\left(2x - \frac{\pi}{3}\right)$,

a) If we rewrite this function using “cosine”, it looks like $f(\theta) = \dfrac{3}{\cos\left(2x - \frac{\pi}{3}\right)}$.

Let $g(\theta) = 3\cos\left(2x - \frac{\pi}{3}\right)$.

b) Although the actual domain of $g(\theta)$ is $\theta \in (-\infty, \infty)$, graph $g(\theta)$ on the interval $\theta \in \left[-\frac{\pi}{2}, \frac{3\pi}{2}\right]$.

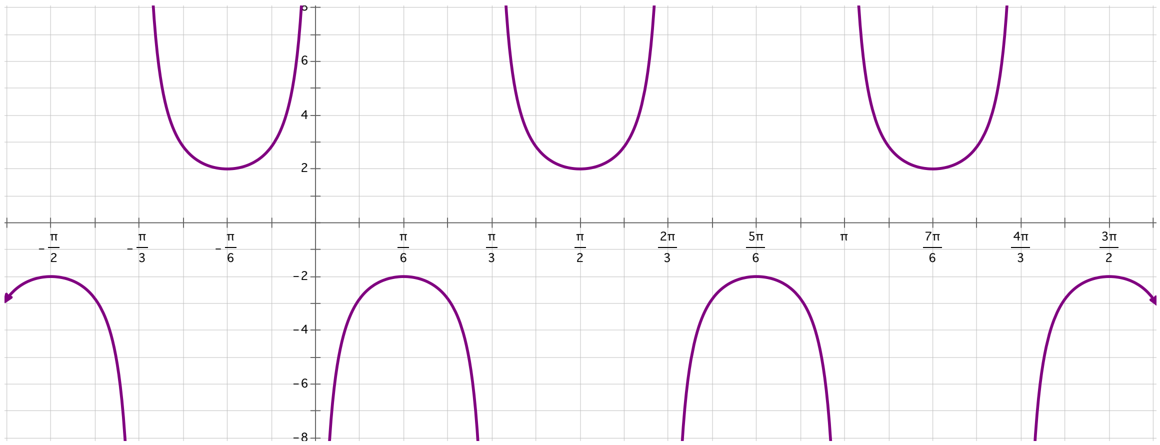


c) The intercepts of $g(\theta)$ provide important information about $f(\theta)$. How does $f(\theta)$ behave near the intercepts of $g(\theta)$? How does $f(\theta)$ behave at the intercepts of $g(\theta)$? How does that help with the graph of $f(\theta)$? Add this information to the graph in part (b).

d) Let α be the smallest positive value of θ for which $g(\theta)$ hits a maximum or minimum. Use exact values to compute $f(\alpha)$ and $g(\alpha)$. What do you notice about the computation (not just the result)? What does this indicate about the behavior of $f(\theta)$ near the maximum/minimum points of $g(\theta)$? Add this information to the graph in part (b).

e) Complete the graph of $f(\theta)$. Realize that the graph of $g(\theta)$ and the vertical asymptotes are NOT part of the graph of $f(\theta)$, but do provide guidance in drawing the graph of $f(\theta)$.

2) Given this graph,



a) Locate the vertical asymptotes and show them on the graph.

b) Sketch in a sine/cosine curve with intercepts that meet up with the asymptotes. This curve should also have a deliberately chosen amplitude!

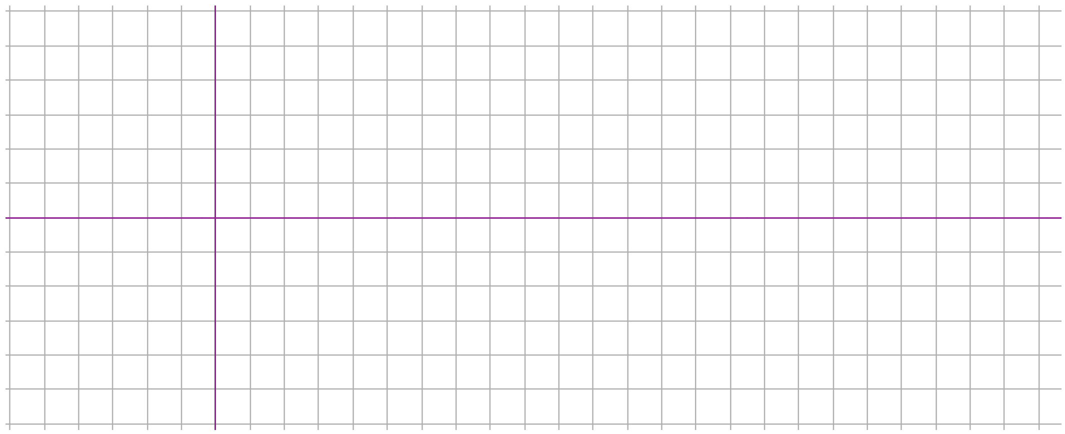
c) Write 4 different equations for your sine/cosine curve (± cos and ± sin). Pick any one of your equations to write an equation for the original curve.

(Note: There are infinitely many possible correct responses!)

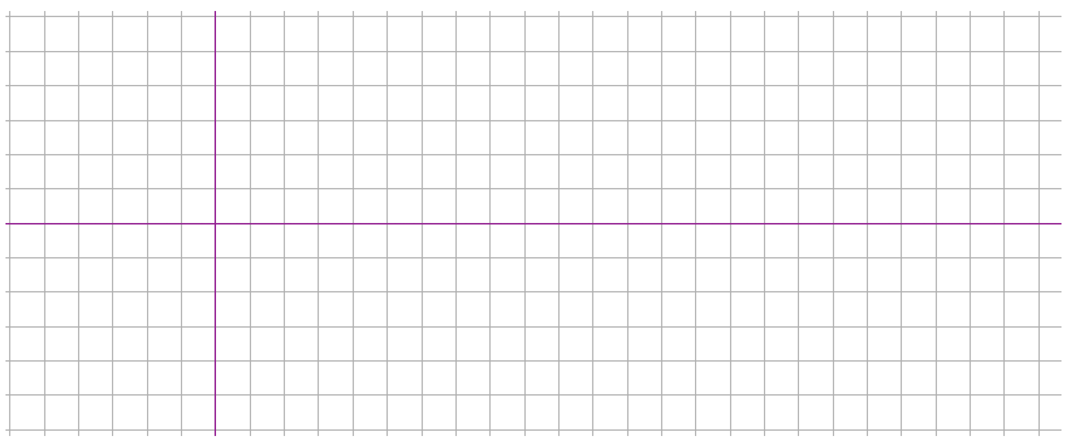
Assignment:

1) Graph each function. (NC)

a) $f(\theta) = 2\csc\left(3\theta - \dfrac{3\pi}{4}\right)$

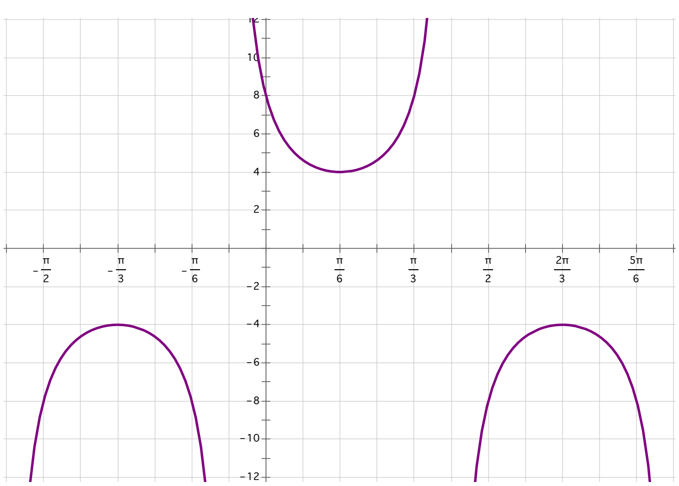


b) $f(\theta) = 4\sec(2\theta + \pi) - 3$



2) Write at least one equation for each function.

a)



b)