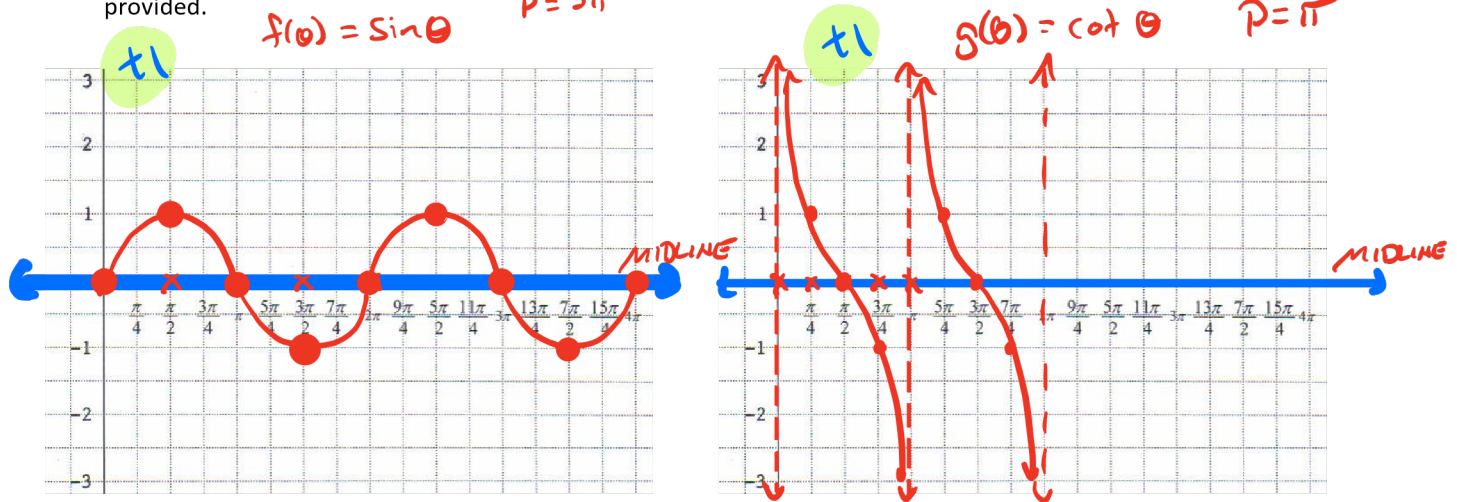


### Free Response Practice #48 Calculator NOT Permitted

The graphs of each of the six trigonometric functions are periodic in nature. Answer the following questions about the graphs of the trigonometric functions.

- a. Sketch a graph of two periods of the functions  $f(\theta) = \sin \theta$  and  $g(\theta) = \cot \theta$  beginning with  $\theta = 0$  on the axes provided.



- b. Identify the domain and range of  $f(\theta)$  and  $g(\theta)$ .

t1  $f(\theta)$ : Domain =  $\mathbb{R}$   
Range =  $[-1, 1]$

t1  $g(\theta)$ : Domain =  $\mathbb{R}$  except  $\pi k$ , where  $k \in \mathbb{Z}$   
Range =  $(-\infty, \infty)$

- c. Which other trigonometric function(s) have the same domain as  $g(\theta)$ ? Justify your reasoning.

t1 {

- $g(\theta) = \cot \theta$  has vertical asymptotes when  $\cot \theta = \frac{x}{y} = \frac{x}{0}$  which happens at multiples of  $\pi$
- FIND another trig function with  $y$  in denominator

t1  $\therefore \csc \theta = \frac{r}{y}$

- d. Describe what effect  $a$  has on the graph of  $h(\theta) = a \sin \theta$ . What would the domain and range of  $h$  be?

t1 {

- If  $a < 0$ , then "a" causes a vertical reflection.
- If  $a \neq 1$ , then "a" causes vertical dilation

t1 Domain =  $(-\infty, \infty)$

t1 Range =  $(-|a|, |a|)$