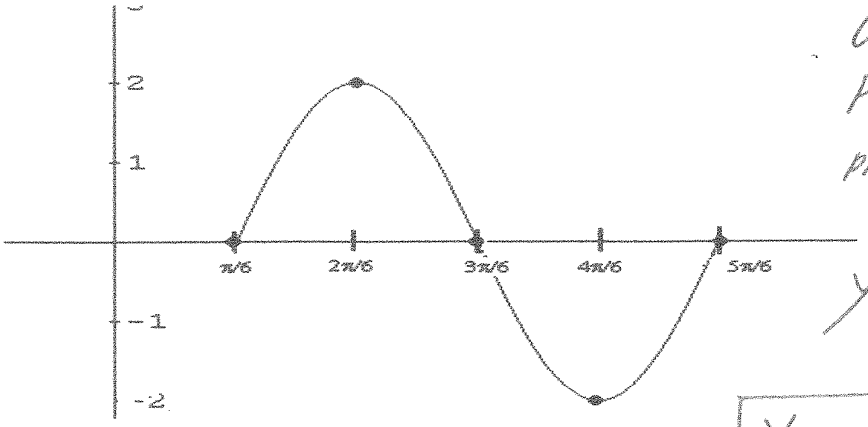
7. Find an **equation** of the form $y = a\sin(bx - c) + d$ whose one cycle of the graph is shown below.

(5 pts)



$a = 2$

$\text{Period} = \frac{2\pi}{3} = \frac{2\pi}{b} \Rightarrow b = 3$

$\text{phase shift} = \frac{\pi}{6}$

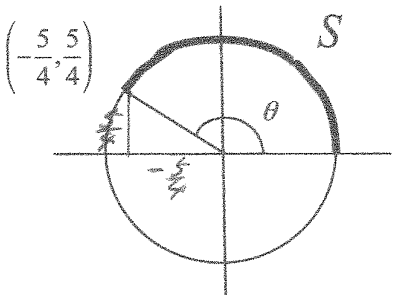
$d = 0$

$y = 2\sin\left[3\left(x - \frac{\pi}{6}\right)\right]$

$\boxed{y = 2\sin\left(3x - \frac{\pi}{2}\right) + 0}$

8. Given that the point $\left(-\frac{5}{4}, \frac{5}{4}\right)$ is a point on the terminal side of an angle θ, consider the diagram below.

(4 pts each)



(a) Find the **exact radius** of the circle.

$r = \sqrt{\left(-\frac{5}{4}\right)^2 + \left(\frac{5}{4}\right)^2} = \sqrt{\frac{25}{16} + \frac{25}{16}} = \sqrt{\frac{50}{16}}$

$= \boxed{\frac{5\sqrt{2}}{4}}$

(a) Find the **exact angle** θ.

$\tan\theta = \frac{\frac{5}{4}}{-\frac{5}{4}} = -1 \Rightarrow \boxed{\theta = \frac{3\pi}{4}}$

(b) Find the **exact value** of $\cot\theta$.

$\cot\theta = \cot\left(\frac{3\pi}{4}\right) = \boxed{-1}$