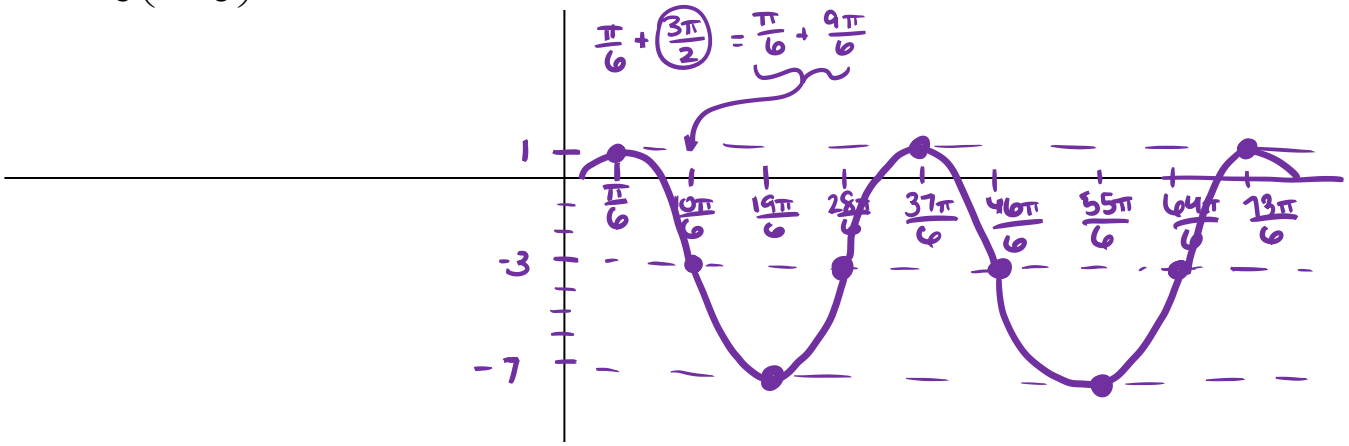
Section 4.4 Practice Worksheet **Name**_____

For #1-3, graph the equation. Make sure to include 2 periods of the graph and all critical points.

1. $y = 4\cos\frac{1}{3}\left(x-\frac{\pi}{6}\right)-3$

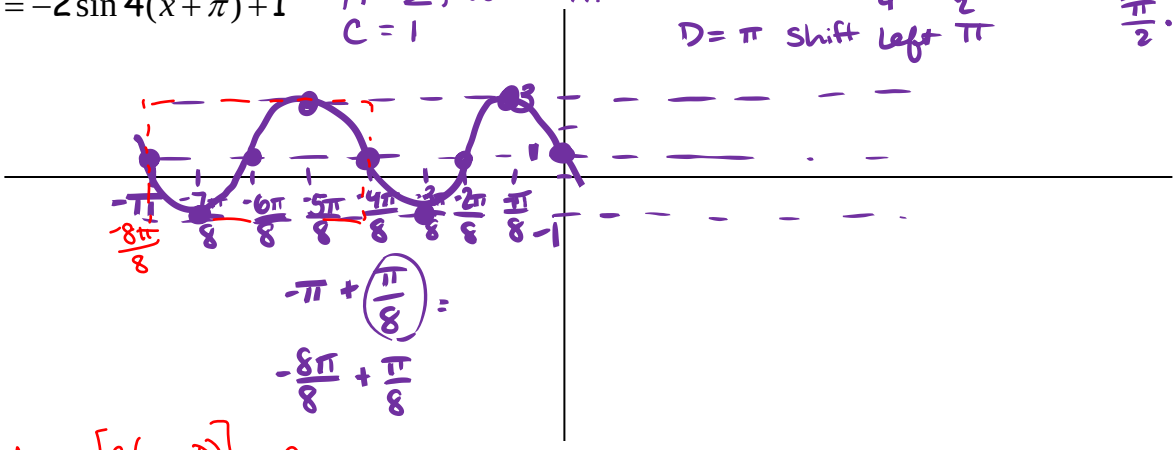
$A=4$ $B=\frac{1}{3}$ Per $=6\pi$ Crit pts every $\frac{6\pi}{4}=\frac{3\pi}{2}$
$C=-3$ $D=\frac{\pi}{6}$ Shift Right $\frac{\pi}{6}$

$\frac{\pi}{6}+\frac{3\pi}{2}=\frac{\pi}{6}+\frac{9\pi}{6}$



2. $y = -2\sin 4(x+\pi)+1$

$A=2$, vert refl. $B=4$ Per: $\frac{2\pi}{4}=\frac{\pi}{2}$ Crit pts every $\frac{\pi}{2}\cdot\frac{1}{4}=\frac{\pi}{8}$
$C=1$ $D=\pi$ Shift Left π



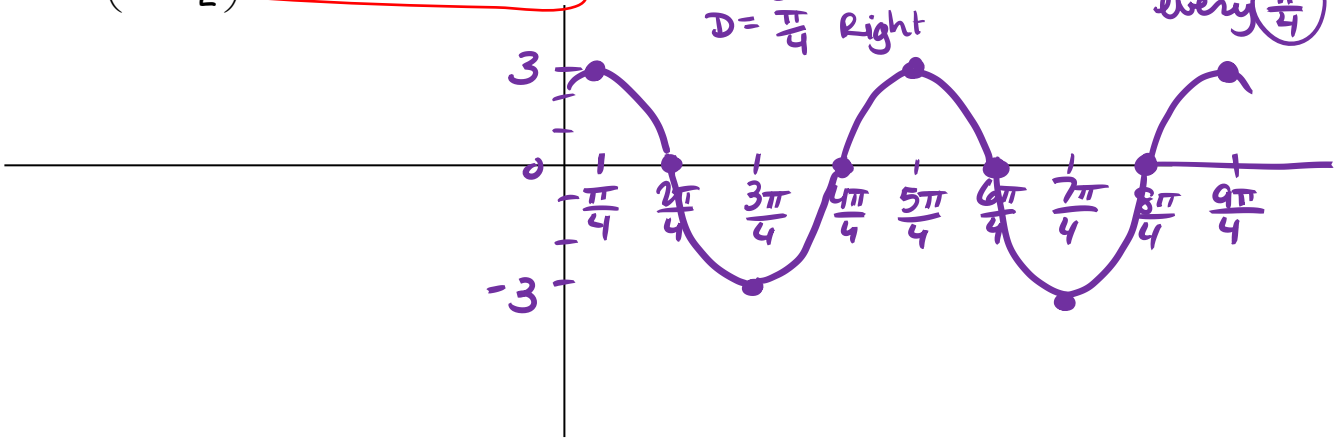
$-\pi+\frac{\pi}{8}=$

$-\frac{8\pi}{8}+\frac{\pi}{8}$

$A\cos[B(x-D)]+C$

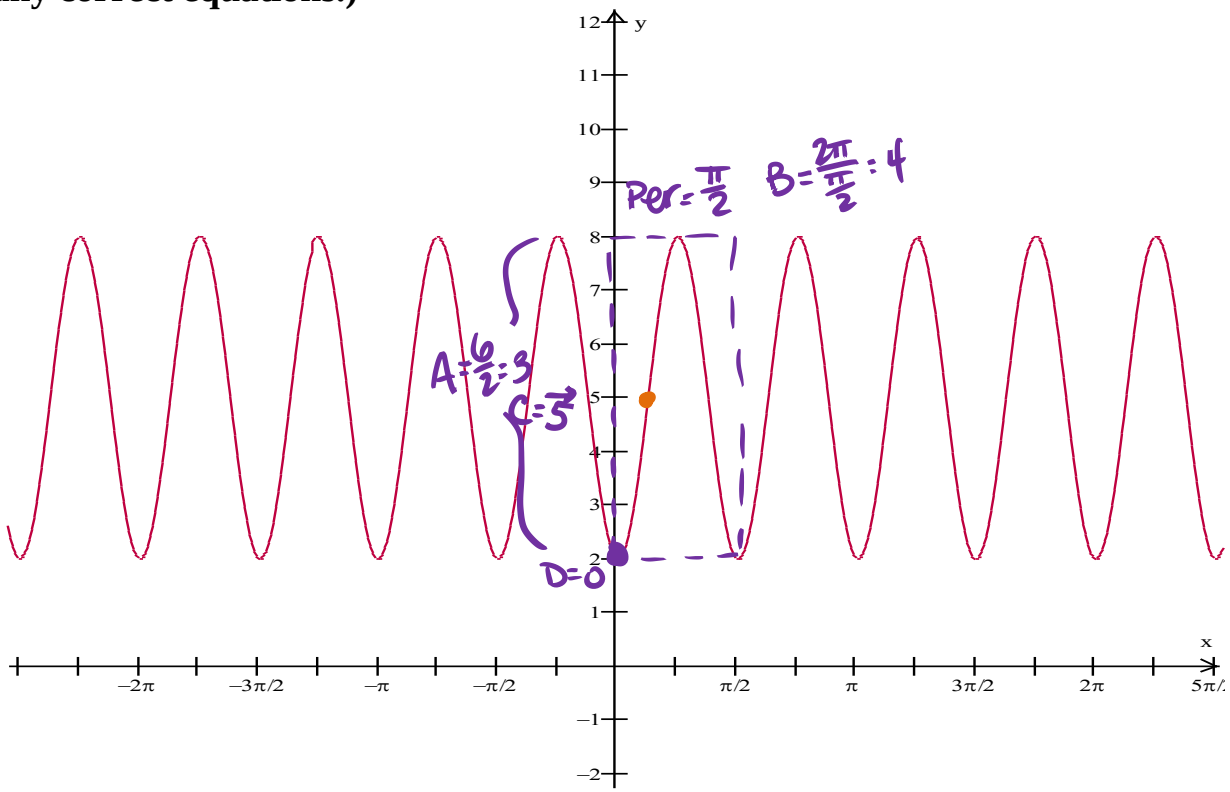
3. $y = 3\cos\left(2x-\frac{\pi}{2}\right) = 3\cos 2\left(x-\frac{\pi}{4}\right)$

$A=3$ $B=2$ Per $=\frac{2\pi}{2}=\pi$ Crit pts every $\frac{\pi}{4}$
$D=\frac{\pi}{4}$ Right



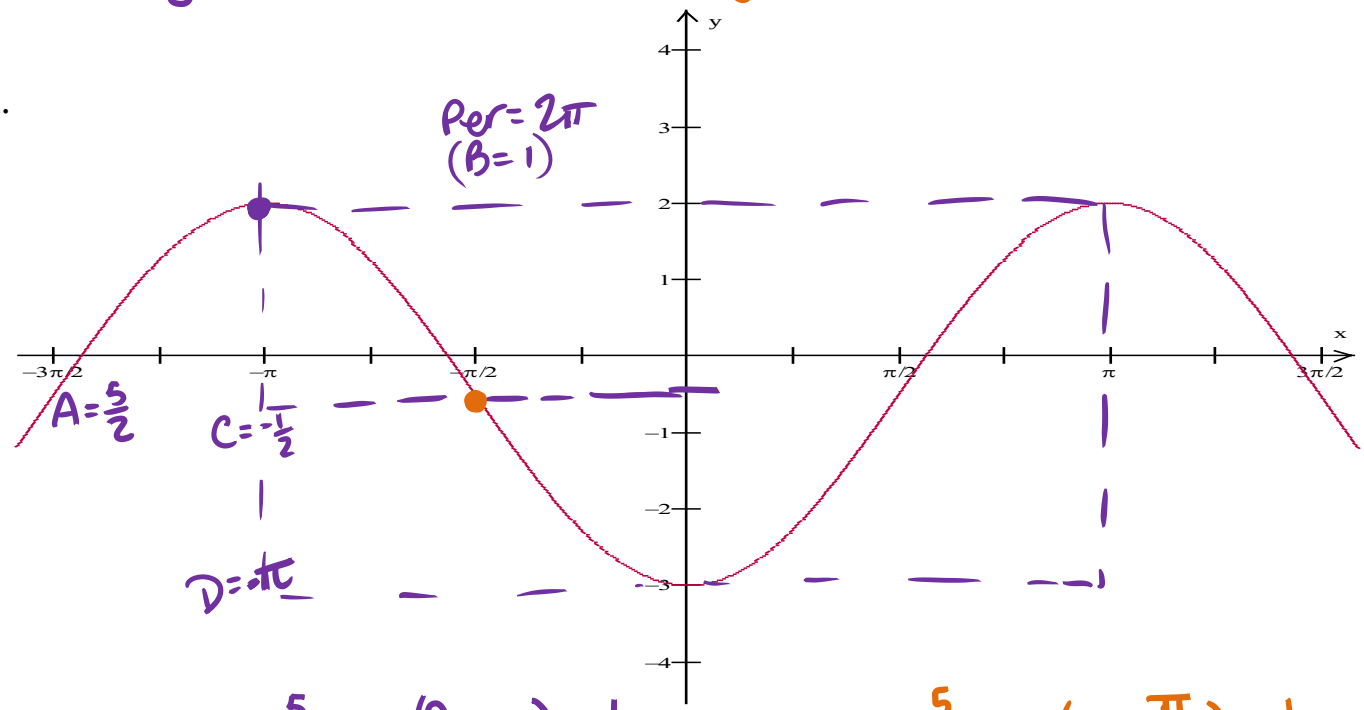
For #4-5, write the equation that best represents the graph. (Reminder: there will be many correct equations.)

4.



Equation: $y = -3\cos 4\theta + 5$ $y = 3\sin 4\left(\theta - \frac{\pi}{4}\right) + 5$

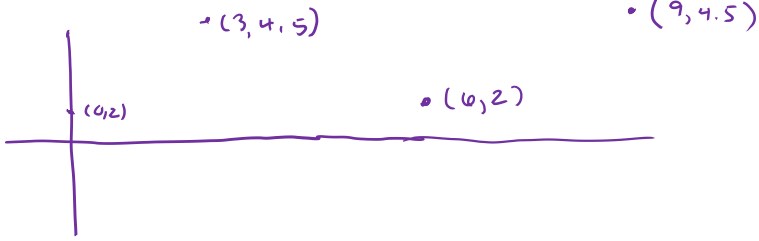
5.



Equation: $y = \frac{5}{2}\cos(\theta + \pi) - \frac{1}{2}$ $y = -\frac{5}{2}\sin\left(\theta + \frac{\pi}{2}\right) - \frac{1}{2}$

6. Charlotte is on a swing at the playground. When she sits on the swing, she is 2 feet from the ground. Her mom pulls her back to give her a swing, and her height off the ground goes to 4.5 feet off the ground. Assume that she swings forward to a height off the ground of 4.5 feet, and that Her mom pushes her so that she keeps the same motion. It takes Charlotte 6 seconds to complete one "swing," from back to front to back again.

A) Draw a graph of Charlotte's height from the ground (in feet) versus the time (in seconds). Draw 4 periods (5 critical points for just the first period).



B: $\pi/3$

$y = 3.25 - 1.25\cos\left(\frac{\pi}{3}x\right)$

B) Write an equation to model your graph.

C) What is Charlotte's height off the ground at 3.4 seconds? At 15.2 seconds? (Round to the 10th.) (CALCULATOR)

3.4 secs => 4.4 ft

15.2 secs => 4.5 ft

D) What is the first time that Charlotte is 3 feet off the ground? What is the *third* time she is 3 feet off the ground? (Round to the 10th of a second.) (CALCULATOR)

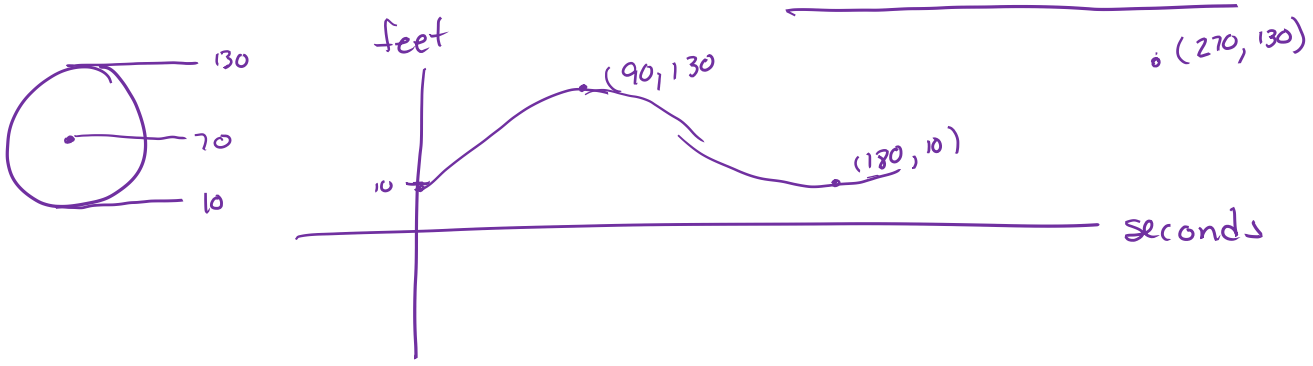
1st time $\approx$ 1.3 secs

3rd time $\approx$ 7.3 secs

7. A Ferris wheel 120 feet in diameter completes 1 revolution every 180 seconds. The lowest point is 10 feet above ground.

$B = \frac{2\pi}{180} = \frac{\pi}{90}$

a) Draw the graph of the situation, starting with a person getting on at the bottom of the wheel at time t = 0 seconds. Assume the person gets to ride for 4 revolutions.



b) Determine an equation to represent the rider's path.

$y = 70 - 60\cos\left(\frac{\pi x}{90}\right)$

c) How high will the rider be after 10 minutes? 10 minutes => 600 seconds

100 feet

d) When will the rider be 100 feet above ground for the first time?

60 seconds