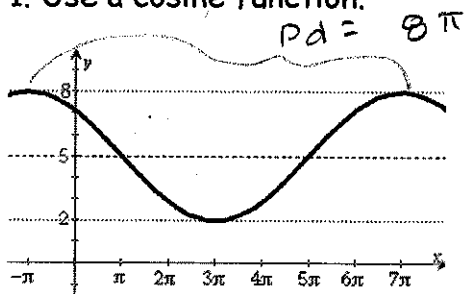


Write an equation for each sinusoid graphed below.

1. Use a cosine function.



$$pd = \frac{2\pi}{b}$$

$$8\pi = \frac{2\pi}{b}$$

$$b = \frac{2\pi}{8\pi}$$

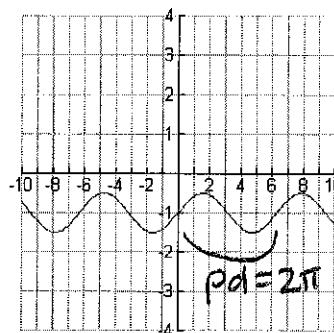
$$b = \frac{1}{4}$$

$$y = 3 \cos \frac{1}{4}(x + \pi) + 5$$

or

$$y = -3 \cos \frac{1}{4}(x - 3\pi) + 5$$

2. Use a sine function.



$$pd = \frac{2\pi}{b}$$

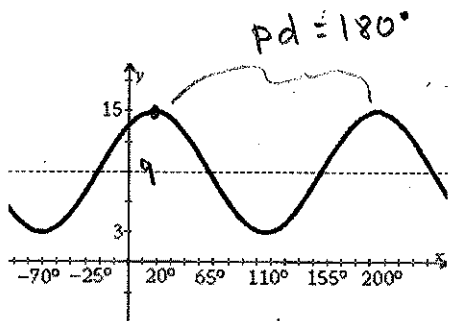
$$2\pi = \frac{2\pi}{b}$$

$$b = \frac{2\pi}{2\pi}$$

$$b = 1$$

$$y = \frac{1}{2} \sin(x) - 1$$

3. Use a cosine function.



$$180 = \frac{360}{b}$$

$$b = \frac{360}{180}$$

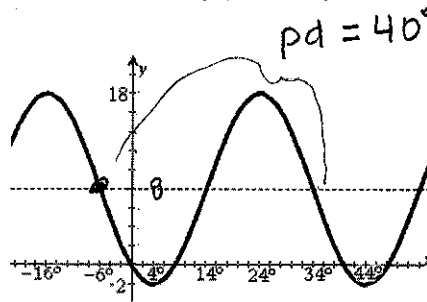
$$b = 2$$

$$y = 6 \cos 2(\theta - 20^\circ) + 9$$

or

$$y = -6 \cos 2(\theta + 70^\circ) + 9$$

4. Use a sine function.



$$40^\circ = \frac{360}{b}$$

$$b = \frac{360}{40}$$

$$b = 9$$

$$y = -10 \sin 9(\theta + 6^\circ) + 8$$

or

$$y = 10 \sin 9(\theta - 14^\circ) + 8$$

5. FERRIS WHEEL

As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. You are the last seat filled and the Ferris wheel starts immediately. Let t be the number of seconds that have elapsed since the Ferris wheel started. You find that it takes you 3s to reach the top, 43 ft. above the ground. The diameter of the wheel is 40 ft.

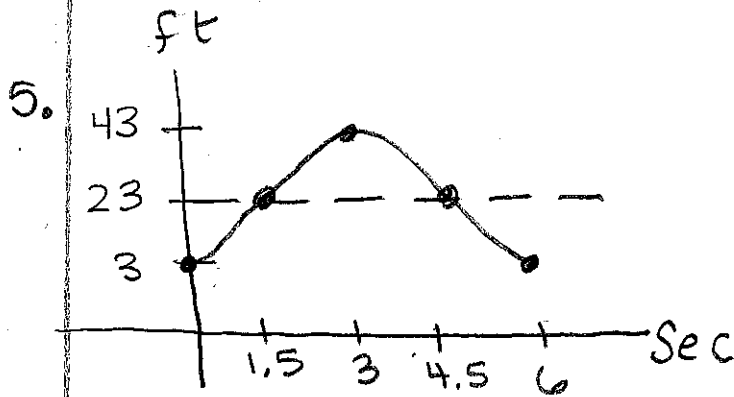
a) Sketch a graph.

b) What is the lowest you go as the Ferris wheel turns, and why is this number greater than zero?

c) Write an equation.

d) Predict your height above the ground when: 1) $t = 6$ 2) $t = 13/3$ 3) $t = 0$

e) What is the value of t the second time you are 18 ft above the ground?



b.) 3 ft above the ground
because the f.w. can't touch
the ground.

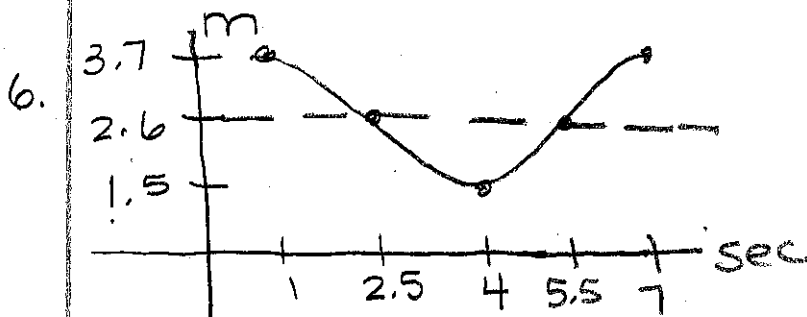
c.) $y = -20 \cos \frac{\pi}{3} x + 23$

d.) 1 → 3 ft

2 → 26.5 ft

3 → 3 ft

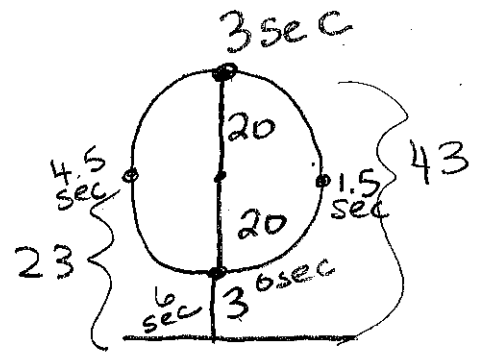
e.) 4.7 sec



b.) $y = 1.1 \cos \frac{\pi}{3} (x-1) + 2.6$

c.) 2.6 m

d.) 3.3 sec.



$Pd = 6$

$b = \frac{2\pi}{b}$

$b = \frac{2\pi}{6}$

$b = \frac{\pi}{3}$

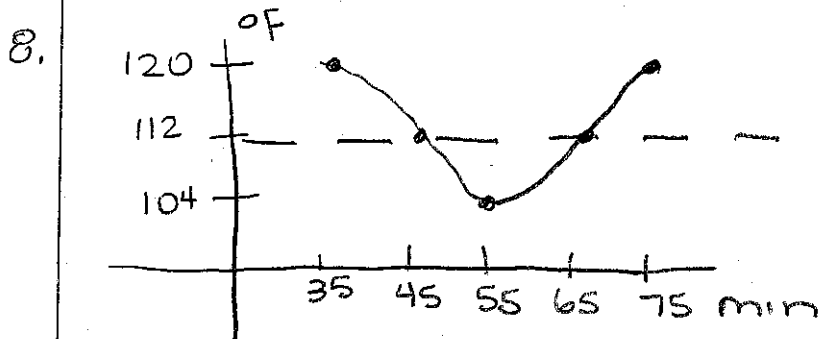
$Pd = 6$

$b = \frac{2\pi}{b}$

$b = \frac{2\pi}{6}$

$b = \frac{\pi}{3}$

7. a.) $1 \rightarrow -5\text{ft}$ $2 \rightarrow 4.3\text{ft}$
 b.) max $\rightarrow 5\text{ft}$ above or $+5\text{ft}$
 min $\rightarrow 5\text{ft}$ below or -5ft
 c.) $Pd = \frac{2\pi}{b} = \frac{2\pi}{\pi/6} = 2 \cdot \frac{6}{1} = 12$



- b.) $y = 8 \cos \frac{\pi}{20} (x-35) + 112$
 c.) 117.7°F
 d.) $3.4\text{min}, 26.6\text{min}, 43.4\text{min}$

$$pd = 40$$

$$40 = \frac{2\pi}{b}$$

$$b = \frac{2\pi}{40}$$

$$b = \frac{\pi}{20}$$

9. a.) 6.5ft
 b.) $.5\text{ft}$
 c.) $Pd = \frac{2\pi}{b} = \frac{2\pi}{1} = 2\pi$
 d.) $.5\text{ft}$

10. a.) $.5$
 b.) $Pd = \frac{2\pi}{b} = \frac{2\pi}{660\pi} = \frac{1}{330}$
 c.) 1