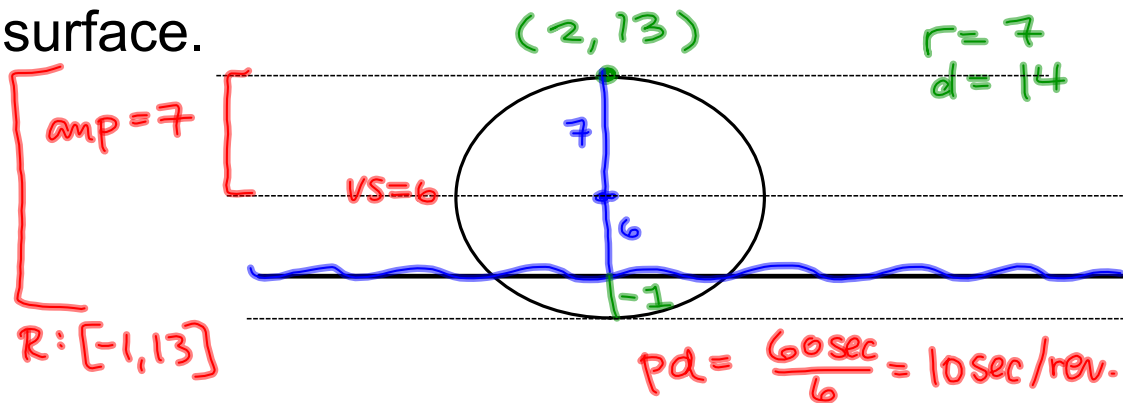
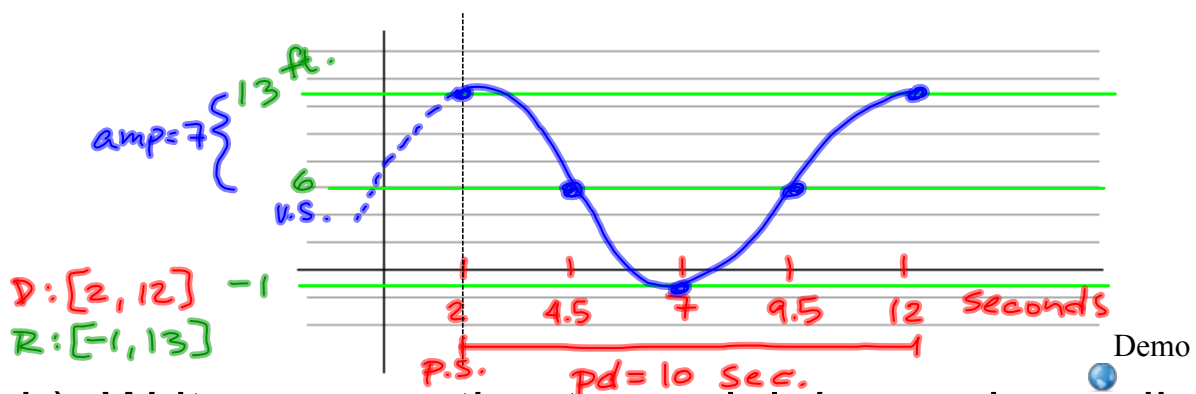


Sinusoidal Applications

Suppose that a waterwheel rotates at 6 revolutions per minute (rev/min). 2 seconds after you start a stopwatch, point P on the rim of the wheel is at its greatest height, $d = 13$ feet, above the surface of the water. The center of the waterwheel is 6 ft above the surface.



a) Sketch the graph of d as a function of time t , in seconds, since you started the stopwatch.



b) Write an equation to model d as a sinusoidal function of t .

$$y = 7 \cos \frac{\pi}{5} (x-2) + 6$$

\uparrow
 $\frac{2\pi}{10}$

c) How high above or below the water's surface will point P be at time $t = 17.5$ seconds? At that time, will it be going up or down?

-0.66 ft (below water) ... coming back up

d) At what positive time t was point P first emerging from the water? 7.86 seconds

e) At what positive time t was point P first at 6 feet above the water? 4.5 seconds

** See graph on last page!!

