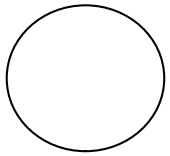
Sinusoidal Applications

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 sinusodial function of *t*.

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?

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

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