9-5 day 2

Find a set of parametric equations. Use #33-36 on page 674 to help.

Ex 1) Line: passes through (0, 0) and (5, -2)

$\frac{\Delta y}{\Delta x} = \frac{-2-0}{5-0} = -\frac{2}{5}$

$y = -\frac{2}{5}x$

1. $x = t$, $y = -\frac{2}{5}t$

2. $x = 2t$, $y = -\frac{2}{5}(2t)$, $y = -\frac{4}{5}t$

$x = 2t$, $y = -\frac{4}{5}t$

Ex 2) Circle: center (2, 1) and radius = 4. (h k r)

$x = h + r\cos\theta$

$y = k + r\sin\theta$

$x = 2 + 4\cos\theta$

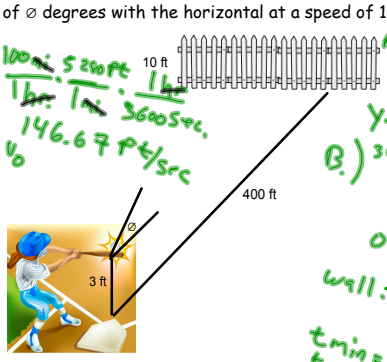
$y = 1 + 4\sin\theta$

Story Problem

Ex 3) Consider a projectile launched at a height of h feet above the ground at an angle of ∅ with the horizontal. The initial velocity is v0 feet per second and the path of the projectile is modeled by the parametric equations.

$$x = (v_o \cos \varnothing)t \text{ and } y = h + (v_o \sin \varnothing)t - 16t^2$$

The center-field fence in a ballpark is 10 feet high and 400 feet from home plate. A baseball is hit 3 feet above the ground. It leaves the bat at an angle of ∅ degrees with the horizontal at a speed of 100 miles per hour.



$\frac{100 \text{ mi}}{1 \text{ hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}}$

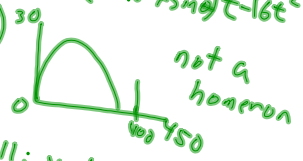
146.67 ft/sec

v_0

A.) $x = (146.67\cos\varnothing)t$

$y = 3 + (146.67\sin\varnothing)t - 16t^2$

B.)



not a homerun

wall: $x = 400$

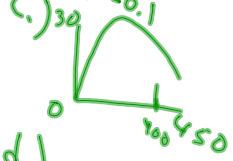
$y = t$

$t_{min} = 0$

$t_{max} = 10$

$t_{str} = 0.1$

C.)



yes, homerun

d) $\varnothing \approx 19.4°$