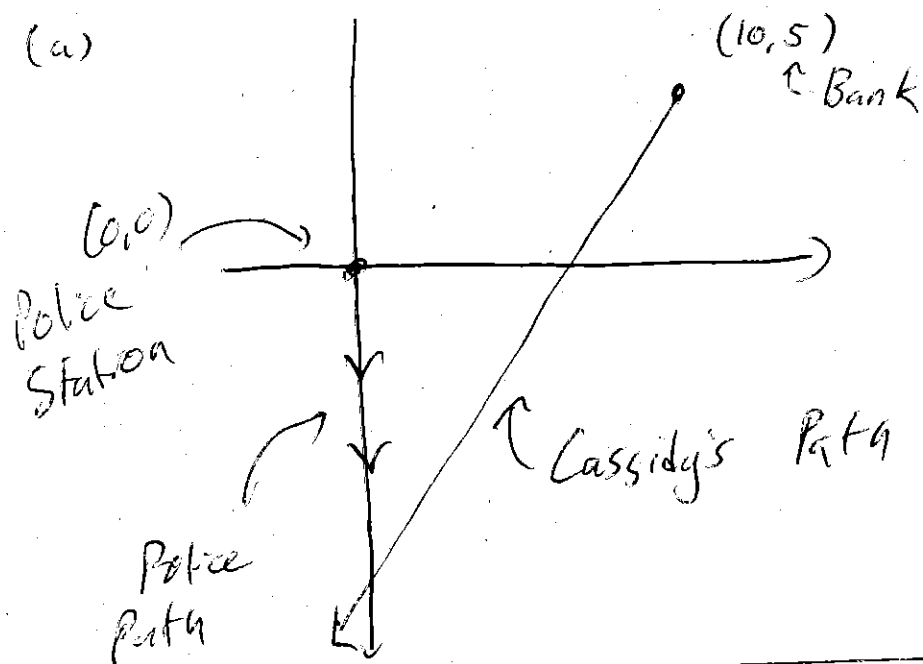


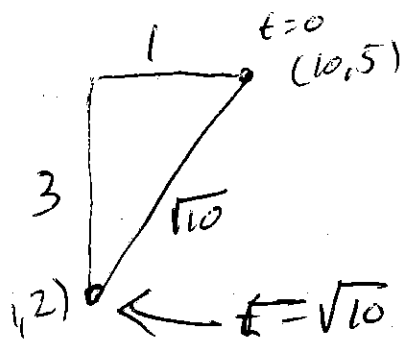
# Quiz 3 Solutions

(a)



(b) 4 pts

Cassidy



$$l = r \cdot t \quad 60 \text{ mph} = 1 \frac{\text{mile}}{\text{minute}}$$

$$\sqrt{10} = 1 \cdot t$$

$$t = \sqrt{10} \text{ mins}$$

x-coord

$$x_c(t) = x_0 + v_x \cdot t$$

$$t=0$$

$$10 = x_0$$

$$t = \sqrt{10} \quad (9,2)$$

$$9 = 10 + \sqrt{10} \cdot v_x$$

$$v_x = \frac{-1}{\sqrt{10}}$$

y-coord

$$y_c(t) = y_0 + v_y \cdot t$$

$$t=0$$

$$5 = y_0$$

$$2 = 5 + \sqrt{10} \cdot v_y$$

$$v_y = \frac{-3}{\sqrt{10}}$$

$$\text{So } x_c(t) = 10 - \frac{1}{\sqrt{10}} t$$

$$y_c(t) = 5 - \frac{3}{\sqrt{10}} t$$

Police 3 pts

$$x_p(t) = 0$$

↑  
move  
straight  
down

$$75 \text{ mph} = \frac{75}{60} \frac{\text{miles}}{\text{min}} = \frac{5}{4} \frac{\text{miles}}{\text{min}}$$

$$y_p(t) = y_0 - \frac{5}{4} t$$

$$y_p(12) = 0 = y_0 - \frac{5}{4} (12)$$

$$y_0 = 15$$

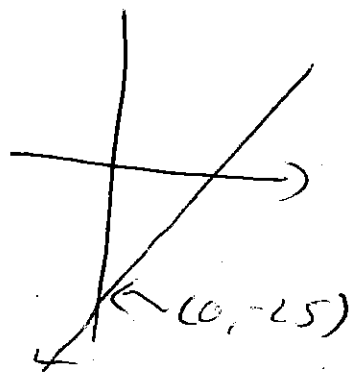
$$y_p(t) = 15 - \frac{5}{4} t$$

(c) Intersect Paths

~~y = 10 - 3~~  $y = 3(x - 10) + 5$

Plug in  $x = 0$

$$y = -30 + 5 = -25$$



When does Cassidy get here?

$$y_c(t) = 5 - \frac{3}{\sqrt{10}}t = -25$$

$$-\frac{3}{\sqrt{10}}t = -30$$

$$t = 10\sqrt{10} \approx 31.623$$

When do Police?

$$y_p(t) = 15 - \frac{5}{4}t = -25$$

$$-\frac{5}{4}t = -40$$

$$t = 32$$

Cassidy gets there first & escapes.

$$d) \quad d(t) = \sqrt{(x_c(t) - x_p(t))^2 + (y_c(t) - y_p(t))^2}$$

$$= \sqrt{(10 - \frac{1}{\sqrt{10}}t)^2 + (5 - \frac{1}{\sqrt{10}}t - (15 - \frac{5}{4}t))^2}$$

Domain

Open ended

$$12 \leq t \leq 32$$

Police

start chasing

Police lose race.