

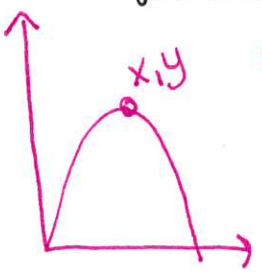
Name: Rogers

Date: _____

Hour: _____

More on projectile Motion

1.) Some Fireworks are fired vertically into the air from the ground at an initial velocity of 80 feet per second. Find the highest point reached by the firework- just as it explodes. $h(t) = -16t^2 + 80t + 0$



$$x = \frac{-80}{2(-16)} = \frac{-80}{-32} = 2.5 \text{ seconds}$$

$$h = -16(2.5)^2 + 80(2.5)$$

$$-100 + 200$$

$$\boxed{100 \text{ feet}}$$

2.) A tennis ball is propelled upward from the face of a racket at 40 feet per second. The racket face is 3 feet above ground when it makes contact with the ball. At what time will the ball be at its highest point? How high is that point?

How long will it take to hit the ground?

$$h(t) = -16t^2 + 40t + 3$$

$$x = \frac{-40}{-32} = \boxed{1.25 \text{ seconds}}$$

$$-16(1.25)^2 + 40(1.25) + 3$$

$$-25 + 50 + 3 = \boxed{28 \text{ feet}}$$

$$x = \frac{-40 \pm \sqrt{1600 - 4(-16)(3)}}{-32}$$

$$x = \frac{-40 \pm \sqrt{1792}}{-32} = -.073$$

$$\boxed{2.57 \text{ seconds}}$$

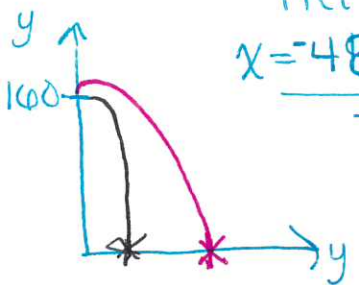
*3.) Sam and Sara have taken their math textbooks to the top of a twelve story building and looked at the pool which is 160 feet straight below them. Sam lets go of his book, while Sara throws her book down with an initial velocity of 48 feet per second. How many seconds does it take each book to hit the water?

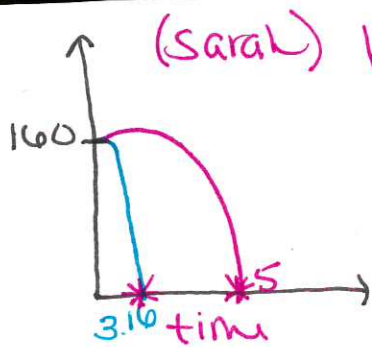
$$h(t) = -16t^2 + 48t + 160 \text{ (Sara)}$$

$$x = \frac{-48 \pm \sqrt{48^2 - 4(-16)(160)}}{-32}$$

$$h(t) = -16t^2 + 0t + 160$$

$$h(t) = -16t^2 + 160 \text{ (Sam)}$$





$$x = \frac{-48 \pm \sqrt{48^2 - 4(-16)(160)}}{-32}$$

$$x = \frac{-48 \pm \sqrt{2304 + 10240}}{-32}$$

$$x = \frac{-48 \pm \sqrt{12544}}{-32}$$

$$x = \frac{-48 \pm 112}{-32} \Rightarrow -2$$

⇓
5 seconds

Sam

$$h(t) = -16t^2 + 0t + 160$$

$$x = \frac{-0 \pm \sqrt{0^2 - 4(-16)(160)}}{2(-16)}$$

$$= \frac{-0 \pm \sqrt{10240}}{-32}$$

$$= \frac{\pm \sqrt{10240}}{-32} \Rightarrow -3.16$$

⇓
3.16 seconds