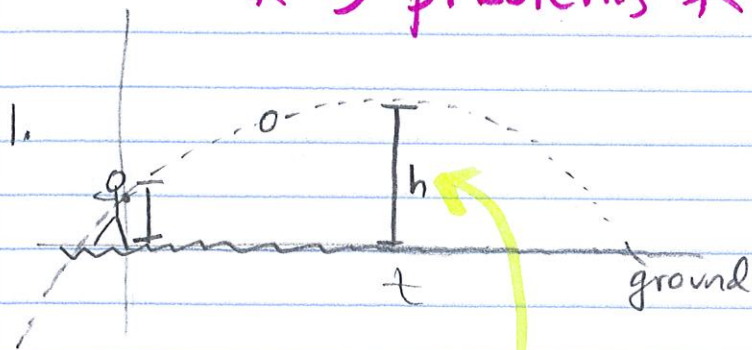


Quadratic Applications ws

* 3 problems *



a) Max. height (find the vertex).

$$h = -16t^2 + 32t + 5$$

$$x = \frac{-32}{2(-16)} = 1 \rightarrow -16(1)^2 + 32(1) + 5 = 21$$

max. height = 21 ft.

b) When the ball hits the ground, the height would equal zero.

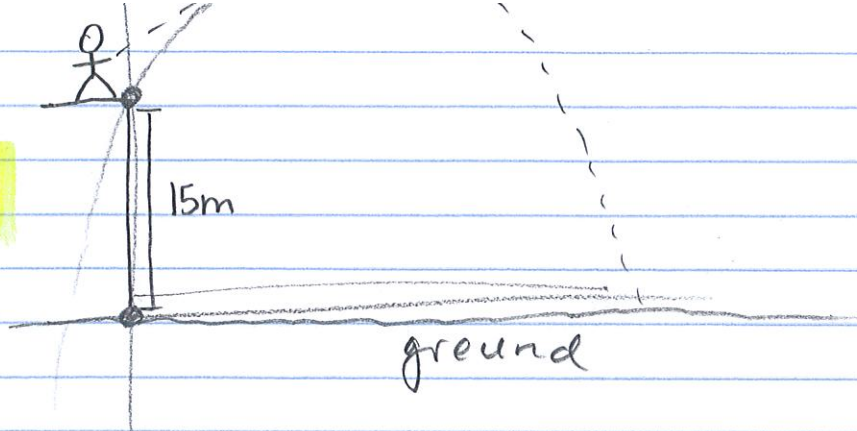
$$0 = -16t^2 + 32t + 5$$

$$\frac{-32 \pm \sqrt{(-32)^2 - 4(-16)(5)}}{2(-16)} = \frac{-32 \pm \sqrt{1344}}{-32}$$

$$\rightarrow x \approx -0.15 \text{ \& } x \approx 2.15$$

2.

a)



b)

Let $t = 3$

$$h = -4.9t^2 + 20t + 15$$

$$h(3) = -4.9(3)^2 + 20(3) + 15 = 30.9$$

After 3 seconds, the ball is 30.9m in the air

c) let $h = 0$ (ground height)

$$0 = -4.9t^2 + 20t + 15$$

$$x = \frac{-20 \pm \sqrt{(20)^2 - 4(-4.9)(15)}}{2(-4.9)}$$

$$x = \frac{-20 \pm \sqrt{694}}{-9.8} \Rightarrow x \approx -.65 \text{ \& } 4.73$$

The ball will hit the ground in 4.73 sec.

$$f(x) = -0.0032x^2 + x + 3$$

3.

a) Find the vertex $x = \frac{-b}{2a} \rightarrow \frac{-1}{2(-.0032)} = 156.25$

$$-.0032(156.25)^2 + 156.25 + 3 = 81.125$$

$$\text{max. height} = 81.125 \text{ ft}$$

b) Solve when $h = 0$

$$0 = -.0032x^2 + x + 3$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(-.0032)(3)}}{2(-.0032)} \approx -2.97 \ \& \ 315.47$$

$$\text{Ball will travel } 315.47 \text{ ft}$$

c) let $x = 100 \rightarrow h(100) = -.0032(100)^2 + 100 + 3$
 $= 71 \text{ ft}$

d) let $h = 50$, solve for x

$$50 = -.0032x^2 + x + 3 \rightarrow 0 = -.0032x^2 + x + 47$$

$$x = \frac{-1 \pm \sqrt{(1)^2 - 4(-.0032)(-47)}}{2(-.0032)} \approx 57.63 \ \& \ 254.87$$