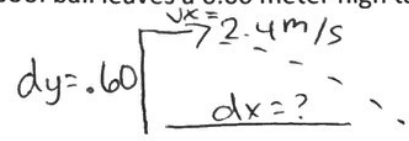
Horizontally Launched Projectiles: Name: Key

1.) A pool ball leaves a 0.60 meter high table with an initial horizontal velocity of 2.4 m/s.



$t = \sqrt{\frac{2dy}{g}}$ $t = \sqrt{\frac{2(.60)}{9.8}}$ $t = .35s$

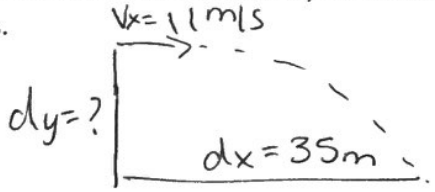
a. Find the horizontal distance in which the ball landed from the base of the table.

$dx = Vx\,t$ $dx = (2.4 m/s)(.35s)$ $\boxed{dx = 8.4m}$

b. What is the final vertical velocity?

$Vfy = Viy + gt$ $Vfy = 0 + (-9.8)(.35)$ $\boxed{Vfy = -3.43 m/s}$

2. A soccer ball is kicked horizontally off a hill and lands a distance of 35 m from the edge of the hill at an initial velocity of 11 m/s.



$dx = Vx\,t$

$35m = 11 m/s\,(t)$ $t = 3.2s$

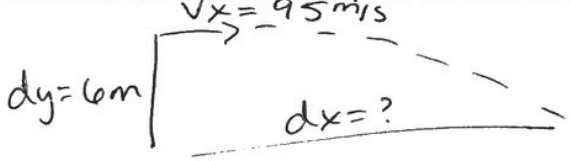
a. How tall is the hill? $dy = \frac{1}{2}gt^2$ $dy = \frac{1}{2}(-9.8)(3.2)^2 = -50m = \boxed{50m\ tall}$

b. What is the final vertical velocity?

$Vfy = Viy + gt$

$Vfy = 0 + (-9.8)(3.2s) = \boxed{-31.4 m/s}$

3. Willie Robertson shoots horizontally at a duck from a height of 6m. If the initial velocity of the bullet is 95 m/s.



$t = \sqrt{\frac{2dy}{g}}$ $t = \sqrt{\frac{2(6)}{9.8}}$ $t = 1.1s$

a. Find the horizontal distance of the bullet traveled during that time.... assuming he missed the duck.

$dx = Vx\,t$

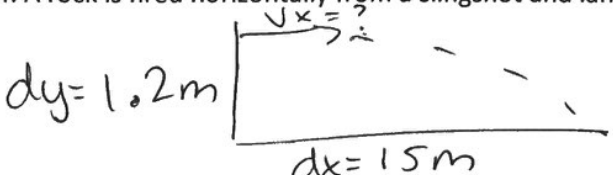
$dx = (95 m/s)(1.1s) = \boxed{104.5m}$

b. What is the final vertical velocity of the bullet?

$Vfy = Viy + gt$

$Vfy = 0 + (-9.8)(1.1s) = \boxed{-10.78 m/s}$

4. A rock is fired horizontally from a slingshot and lands a horizontal distance of 15m. If the slingshot is 1.2 m high.



$t = \sqrt{\frac{2(dy)}{g}}$ $t = \sqrt{\frac{2(1.2)}{9.8}}$ $t = .5s$

a. How fast was the rock going when released from the slingshot? $dx = Vx\,t$

b. What is the final vertical velocity of the rock before it hit the ground? $\frac{15m}{.5} = \frac{(Vx)(.5s)}{.5}$ $\boxed{Vx = 30 m/s}$

$Vfy = Viy + gt$

$Vfy = 0 + (-9.8)(.5) = \boxed{-4.9 m/s}$