Horizontal Shooting

Physics

Name _____

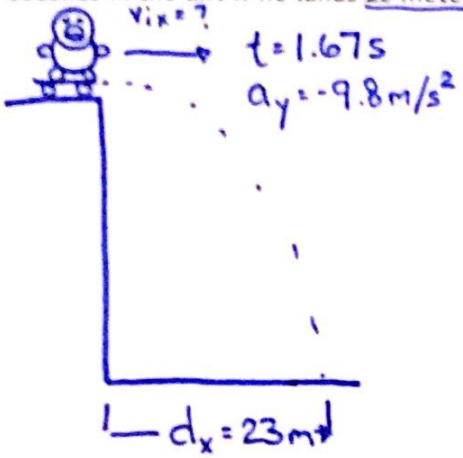
1 2 3 4 5 6 7 8

1. A giraffe is wearing leg warmers and rollerblades as he approaches the edge of a cliff. If he rolls off horizontally at 7 m/s, fill in the following table for the giraffe's motion in the next five seconds.

$v_x = 7 m/s$ →

Time	V_x	ΔX	V_y	ΔY
0 sec	7	0	0	0
1 sec	7	7	-9.8	-4.9
2 sec	7	14	-19.6	-19.6
3 sec	7	21	-29.4	-44.1
4 sec	7	28	-39.2	-78.4
5 sec	7	35	-49	-122.5

2. A large bear wearing undersized clothing is riding a skateboard. He rolls horizontally off of a cliff and spends 1.67 seconds in the air. If he lands 23 meters from the edge of this cliff, how fast was he initially moving?

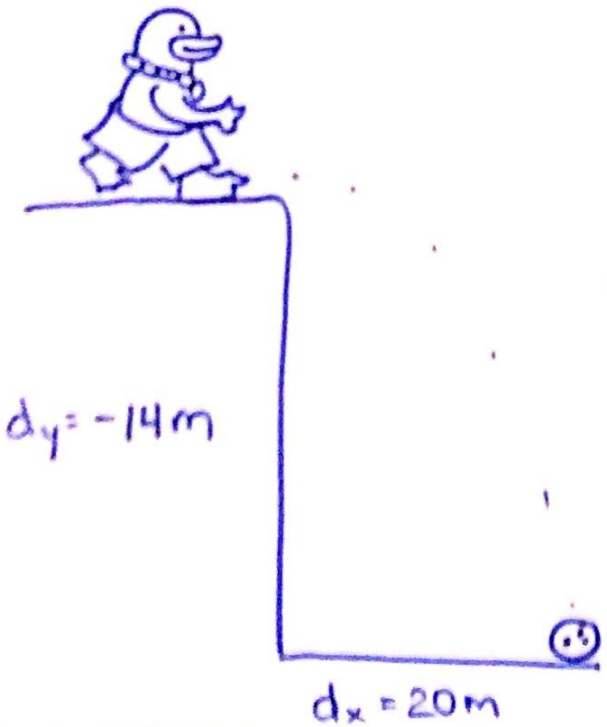


	X	Y
G	$t = 1.67s$ $a_x = 0 m/s^2$ $d_x = 23m$	$t = 1.67s$
U	$v_x = ?$	
E	$v_x = \frac{d_x}{t}$	
SIS		

$v_x = \frac{23m}{1.67s}$

$v_x = 13.8 m/s$

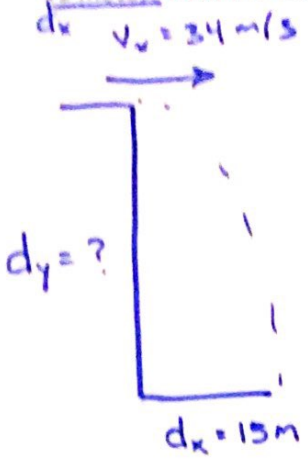
3. A small platypus is wearing gold chains and saggy jeans. If he bowls a bowling ball horizontally off a 14m cliff, and notes that the ball lands 20 meters from the base of the cliff, how long did the bowling ball spend in the air?



	X	Y
G	$d_x = 20m$	$d_y = -14m$ $a_y = -9.8 m/s^2$ $v_{iy} = 0 m/s$
U	$t = ?$	$t = ?$
E		$d_y = v_{iy}t + \frac{1}{2}a_y t^2$
SIS		$-14 = 0 \cdot t + \frac{1}{2}(-9.8)t^2$

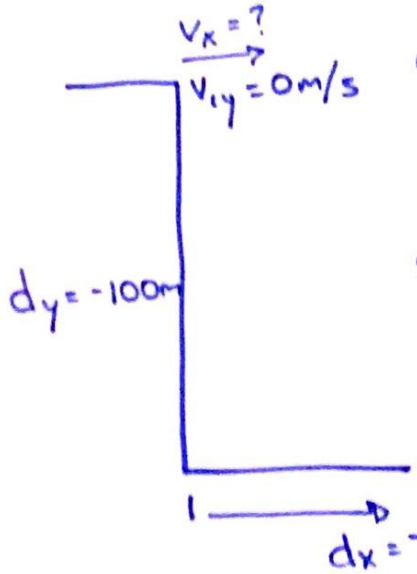
$t = 1.69s$

4. A snooty owl drives his fancy car while texting. If he drives horizontally off a cliff at 34 meters per second, and lands 15 meters from the base, how tall was the cliff that he drove off of?



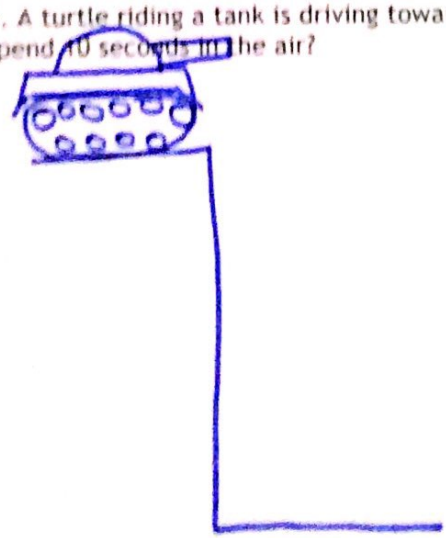
	X	Y
G	$d_x = 15m$ $v_x = 34m/s$	$v_{iy} = 0m/s$ $a_y = -9.8\ m/s^2$
U	$t = ?$	$t = 0.441s$
E	$v_x = \frac{d_x}{t}$	$d_y = ?$ $d_y = v_{iy}t + \frac{1}{2}a_y t^2$
S/S	$34 = \frac{15}{t}$ $t = 0.441s$	$d_y = 0t + \frac{1}{2}(-9.8)t^2$ $d_y = -0.95m$ → 0.95m = height

5. A hipster hippo rides his vintage bike toward a cliff. If he wants to land in a record store that is 75 meters from the bottom of a 100 meter tall cliff, how fast should he ride horizontally off the cliff?



	X	Y
G	$d_x = 75m$ $t = 4.518s$	$v_{iy} = 0m/s$ $a_y = -9.8\ m/s^2$ $d_y = -100m$
U	$v_x = ?$	$t = ?$
E	$v_x = \frac{d_x}{t}$	$d_y = v_{iy}t + \frac{1}{2}a_y t^2$
S/S	$v_x = \frac{75m}{4.518s}$ $v_x = 16.6\ \frac{m}{s}$	$-100 = 0t + \frac{1}{2}(-9.8)t^2$ $-100 = -4.9t^2$ $t = 4.518s$

6. A turtle riding a tank is driving toward a horizontal cliff at 12 m/s. How high should the cliff be if the turtle wants to spend 10 seconds in the air?



	X	Y
G		$t = 10s$ $v_{iy} = 0m/s$ $a_y = -9.8\ m/s^2$
U		$d_y = ?$
E		$d_y = v_{iy}t + \frac{1}{2}a_y t^2$
S/S		$d_y = 0(10) + \frac{1}{2}(-9.8)(10)^2$ $d_y = -4.9 \cdot 10^2$ $d_y = -490m$ → Height = 490m