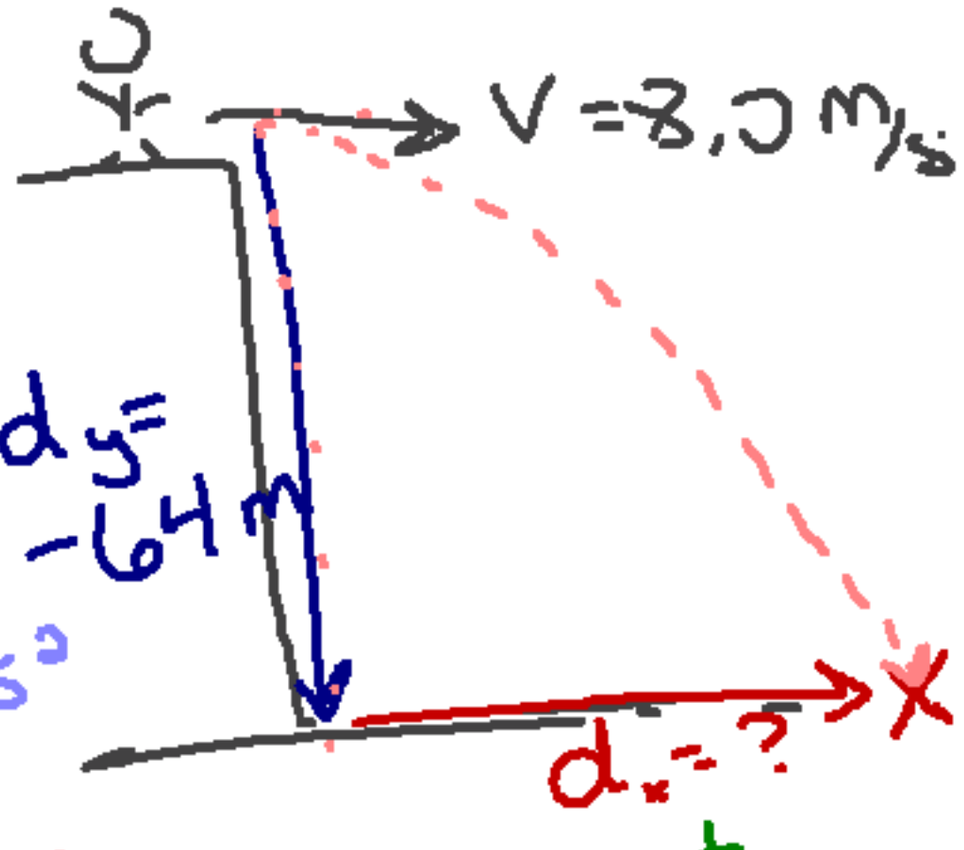
Practice Problems: Horizontal Projectiles

P.172

39)

X	y
$V_x = 8.0\ m/s$	$V_0 = 0\ m/s$
$d_x = ?$	$V_f =$
$t = 3.6\ s$	$a = -9.81\ m/s^2$
	$d_y = -64\ m$
	$t = ? = 3.6\ s$



$V_x = \frac{d_x}{t}$

$V_f = V_0 + at$

$V_f^2 = V_0^2 + 2ad$

$d = V_0 t + \frac{1}{2} a t^2$

$$d = v_0 t + \frac{1}{2} a t^2$$

$$(-64) = (0)t + \frac{1}{2}(-9.81)(t^2)$$

$$\frac{(-64)(2)}{(-9.81)} = t^2$$

$$13.05 = t^2$$

$$3.6\text{s} = t$$

$$v_x = \frac{d_x}{t}$$

$$d_x = v_x \cdot t$$

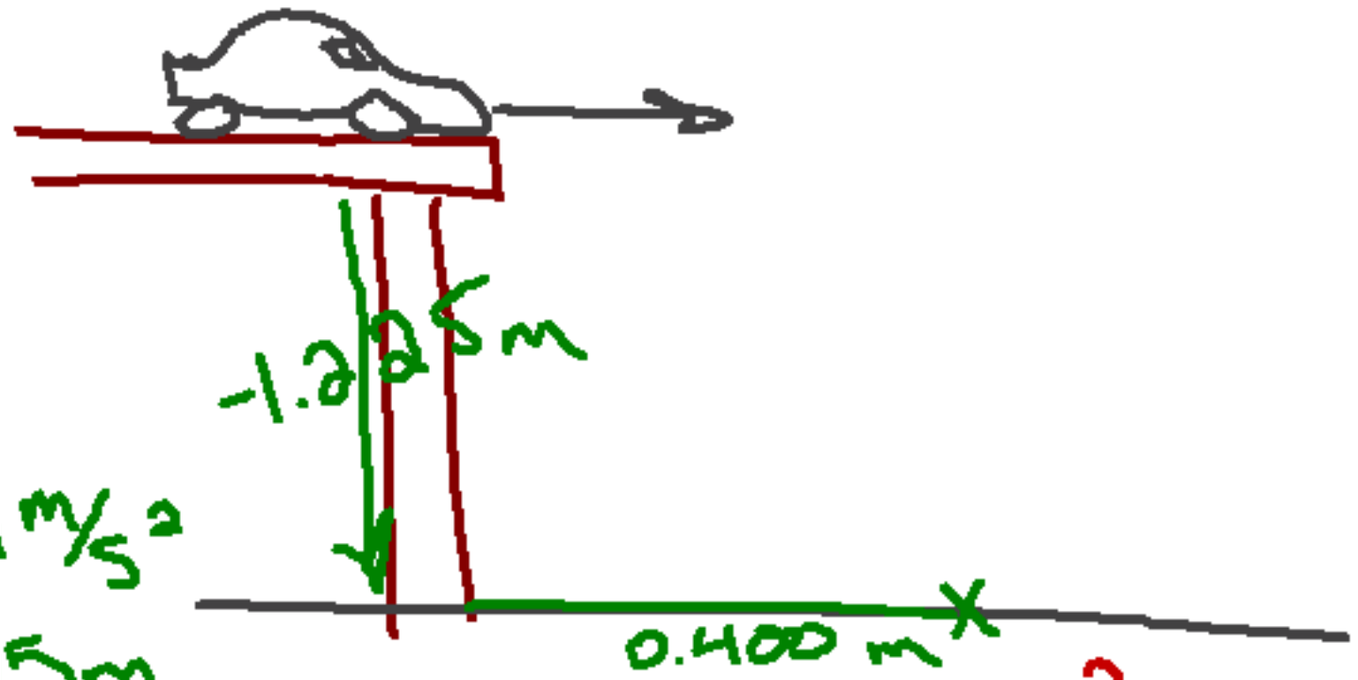
$$= (8.0)(3.6)$$

$$= 28.8\text{ m}$$

$$= \boxed{29\text{ m}}$$

40)

horiz.	Vert.
$V_x = ?$	$V_0 = 0\ m/s$
$d_x = 0.400m$	$V_f =$
$t = 0.500s$	$a = -9.81 m/s^2$
	$d_y = -1.225m$
	$t = ?.0.500\ s$



$$d = V_0 t + \frac{1}{2} a t^2$$

$$(-1.225) = (0)t + \frac{1}{2}(-9.81)t^2$$

$$\frac{(-1.225)(2)}{-9.81} = t^2$$

$$\sqrt{\quad} = \sqrt{t^2} \Rightarrow t = 0.500\ s$$

$$V_x = \frac{d_x}{t} = \frac{0.400m}{0.500s}$$

$$= 0.800 m/s$$

Practice Problems: Horizontal Projectiles

p.172

*39)

X	Y
$V_x = 8.0\ m/s$	$V_0 = 0$
$d_x = ?$	V_f
$t = 3.61\ s$	$a = -9.81\ m/s^2$
	$d_y = -64.0\ m$
	$t = ?$

same

$V_x = \frac{d_x}{t}$

$d_x = V_x \cdot t$

$d_x = (8.0)(3.61)$

$= 28.9\ m$

$= \boxed{29\ m}$

$V_f = V_0 + at$

$V_f^2 = V_0^2 + 2ad$

$d = V_0 t + \frac{1}{2} a t^2$

} use with vertical values

$$d = v_0 t + \frac{1}{2} a t^2$$

$$(-64.0) = (0)(t) + \frac{1}{2}(-9.81)(t^2)$$

$$\frac{(-64.0)(2)}{(-9.81)} = t^2$$

$$13.05 = t^2$$

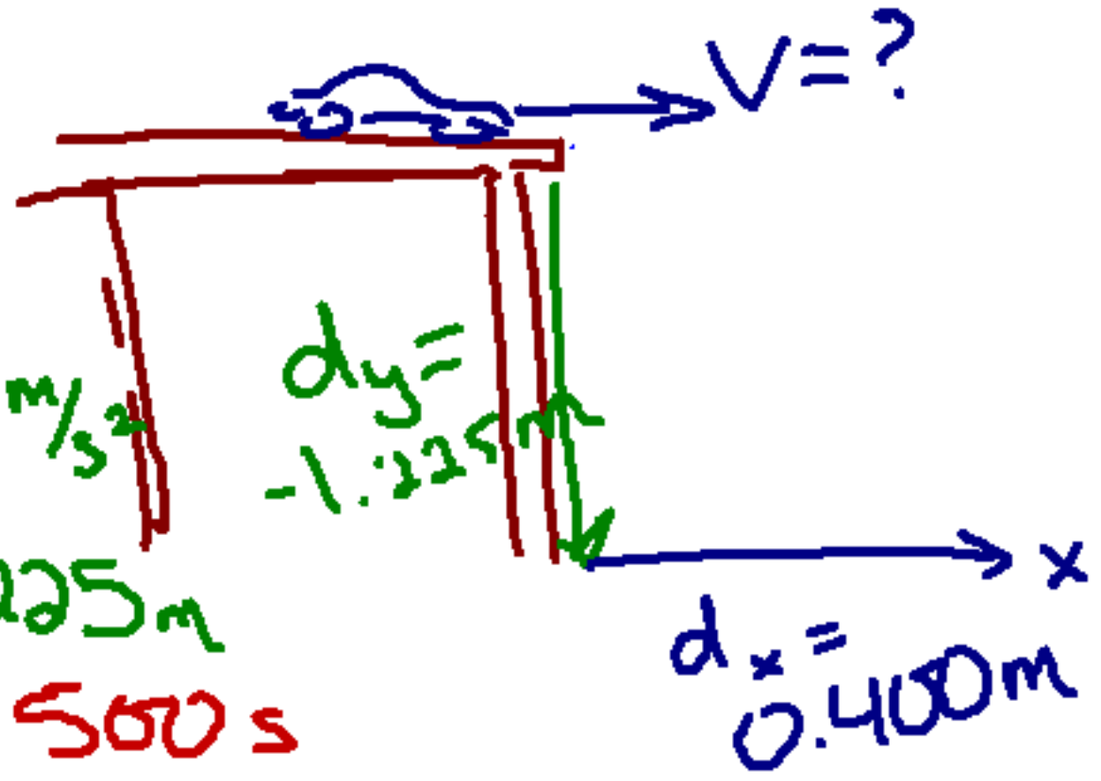
$$3.61\ s = t$$

→ The time it takes the keys to drop from the top of the cliff to the bottom.

Same in both x & y directions!

40)

horizontal	Vertical
$V_x =$	$V_0 = 0\ m/s$
$d_x = 0.400\ m$	$V_f =$
$t = 0.500\ s$	$a = -9.81\ m/s^2$
	$d_y = -1.225\ m$
	$t = 0.500\ s$



$$d = V_0 t + \frac{1}{2} a t^2$$

$$(-1.225) = (0)t + \frac{1}{2}(-9.81)t^2$$

$$\frac{(-1.225)(2)}{(-9.81)} = t^2 = 0.2497$$

$$t = 0.500\ s$$

$$V_x = \frac{d_x}{t}$$

$$V_x = \frac{0.400\ m}{0.500\ s}$$

$$V_x = 0.800\ m/s$$

Homework: Due Wednesday, 11/12/08

P. 158: 9, 11

P. 172: 41, 45, 47

Answers:

9) a) 4.0 s
b) 20. m
c) $V_x = 5.0$ m/s
$V_y = 39$ m/s

11) 0.800 m/s

41) 33 m high
7.3 m from edge

45) a) 14.3 s
b) 496 m

47) 3.2 m

Catapult Project Date Changes

Wed + Thurs. 11/19-20 → Still work Days

Fri. 11/21 → NOT a work day

Tues. 11/25 → Now a work Day

Mon. 12/1 → All Catapults Due

All other dates remain the same!