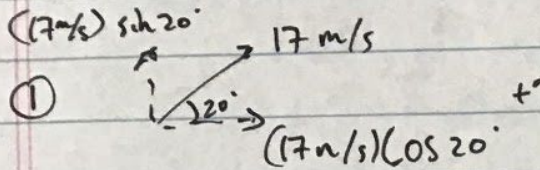


Problem Set #4

p. 1

①



V	H
$v_1 = 5.81 \text{ m/s}$	$v = 15.97 \text{ m/s}$
$v_2 = 0$	$\Delta d =$
$a = -9.8 \text{ m/s}^2$	$\Delta t =$
$\Delta d = ?$	
$\Delta t = x$	

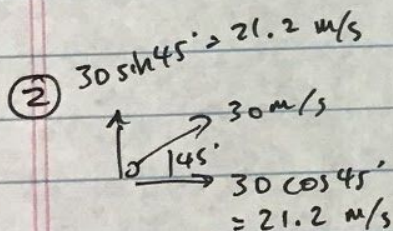
vertically:

$$v_2^2 = v_1^2 + 2a\Delta d$$

$$0 = (5.81 \text{ m/s})^2 + 2(-9.8 \text{ m/s}^2)\Delta d$$

$$\Delta d = \frac{-33.81 \text{ m}^2/\text{s}^2}{-19.6 \text{ m/s}^2}$$

$$\Delta d = 1.7 \text{ m} \quad (\text{above the release point})$$



V	H
$v_1 = 21.2 \text{ m/s}$	$v = 21.2 \text{ m/s}$
$v_2 = x$	$\Delta d = ?$
$a = -9.8 \text{ m/s}^2$	$\Delta t =$
$\Delta d = 0$	
$\Delta t =$	

vertically:

$$\Delta d = v_1 \Delta t + \frac{1}{2} a (\Delta t)^2$$

$$0 = 21.2 \Delta t + \frac{1}{2} (-9.8) (\Delta t)^2$$

$$0 = 21.2 \Delta t - 4.9 (\Delta t)^2$$

$$0 = \Delta t (21.2 - 4.9 \Delta t)$$

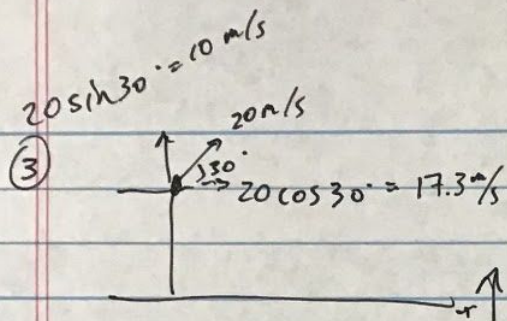
$$\Delta t = 0 \quad \text{or} \quad \Delta t = \frac{21.2}{4.9} = 4.33 \text{ s}$$

horizontally:

$$\Delta d = v \Delta t$$

$$= (21.2 \text{ m/s}) (4.33 \text{ s})$$

$$\Delta d = 92 \text{ m}$$



p. 2

V	H
$V_x = 10 \text{ m/s}$ $V_y = -9.8 \text{ m/s}^2$ $\Delta t = 3.0 \text{ s}$	$V = 17.3 \text{ m/s}$ $\Delta d =$ $2t = 3.0 \text{ s}$

a) horizontally: $\Delta d = v \Delta t$
 $= (17.3 \text{ m/s})(3.0 \text{ s})$
 $\therefore \Delta d = 52 \text{ m}$

b) vertically: $\Delta d = v_i \Delta t + \frac{1}{2} a (\Delta t)^2$
 $\Delta d = (10 \text{ m/s})(3 \text{ s}) + \frac{1}{2} (-9.8 \text{ m/s}^2)(3 \text{ s})^2$
 $\Delta d = 30 \text{ m} - 44.1 \text{ m}$
 $\Delta d = -14.1 \text{ m} \text{ [up]}$
 $\therefore \Delta d = 14.1 \text{ m} \text{ [down]}$

\therefore height of cliff = 14 m (rounded)

c) find max height of ball:

$v_i = 10 \text{ m/s}$

$v_f = 0$

$a = -9.8 \text{ m/s}^2$

$\Delta d = ?$

$\Delta t = \times$ (not 3.0 s!)

$v_f^2 = v_i^2 + 2a\Delta d$

$0 = (10 \text{ m/s})^2 + 2(-9.8 \text{ m/s}^2)\Delta d$

$\Delta d = \frac{-100 \text{ m}^2/\text{s}^2}{-19.6 \text{ m/s}^2}$

$\Delta d = 5.1 \text{ m}$

\therefore add 5.1 m to height of cliff
 $= 19 \text{ m from ground level}$

LIKE
A NEW
QUESTION