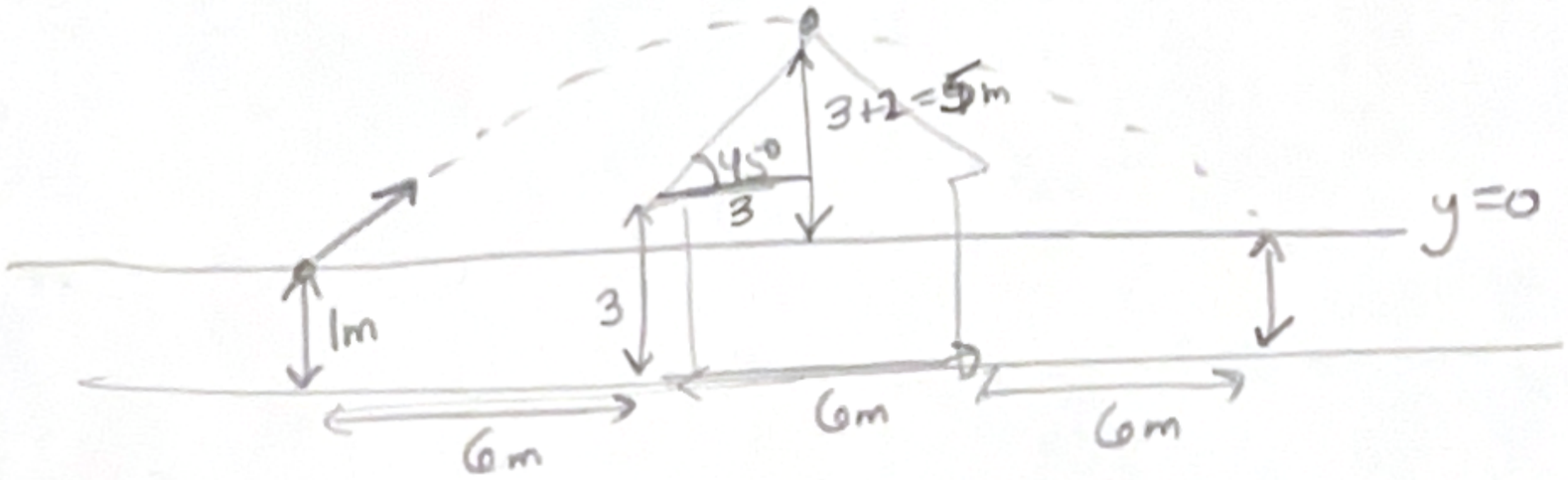
Ch4 p. 108 #55



a. Interval: From t=0 to max height

Horiz	Vert
$\Delta x = 9m$	$\Delta y = 5m$
$V_x =$	$V_{iy} =$
$\Delta t =$	$V_{fy} = 0$
	$a_y = -9.8 m/s^2$
	$\Delta t =$

From the vertical direction, I can find V_{iy}:

$$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$$
$$0 = V_{iy}^2 + 2(-9.8 m/s^2)(5m)$$
$$98 = V_{iy}^2$$
$$9.9 m/s = V_{iy}$$

I can also find Δt to max Ht: That will help me find V_x!

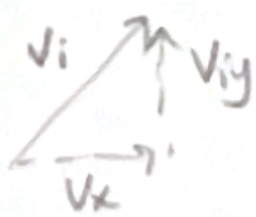
$$V_{fy} = V_{iy} + a_y \Delta t$$
$$0 = 9.9 m/s + (-9.8 m/s^2)\Delta t$$
$$1.01 s = \Delta t$$

$$\Delta x = V_x(\Delta t)$$
$$9m = (V_x)(1.01s)$$
$$8.9 m/s = V_x$$

So, the minimum speed is $V_i^2 = V_x^2 + V_{iy}^2$

$$V_i^2 = (8.9 m/s)^2 + (9.9 m/s)^2$$
$$V_i = 13.3 m/s \approx \boxed{13 m/s}$$

b. Find the angle:



$$\tan\theta = \frac{V_{iy}}{V_x}$$
$$\tan\theta = \frac{9.9 m/s}{8.9 m/s}$$
$$\theta = \boxed{48°}$$