

P 116 Problems 61, 64

⑤
(6 parts)

Graph Projectile motion → online
Rank Projectile motion Simulation

- Problems

61) $\theta = 10^\circ$
 $x = 69.5 \text{ m}$
 $v_0 = ?$

$$x = v_0 \cos \theta t \quad t = \frac{-2v_0 \sin \theta}{a_y}$$

$$x = v_0 \cos \theta \left(\frac{-2v_0 \sin \theta}{a_y} \right)$$

(1)

	x	y
d	69.5	0
t		
a	0	-9.81
v_0	$v_0 \cos \theta$	$v_0 \sin \theta$
v	$v_0 \cos \theta$	$-v_0 \sin \theta$

$$v_0^2 = \frac{x a_y}{\sqrt{-2(\cos \theta \sin \theta)}}$$

$$= \sqrt{\frac{(69.5 \text{ m})(-9.81 \text{ m/s}^2)}{-2(\cos 10^\circ \sin 10^\circ)}}$$

$$= 45 \text{ m/s}$$

5

6A) $y_0 = 2.4 \text{ m}$
 $v_{0x} = 22.3 \text{ m/s}$

Will it cross .91m net 11.9m
 from server

b) a) ① $t = \frac{11.9 \text{ m}}{22.3 \text{ m/s}} = .534 \text{ s}$

② $y = \frac{1}{2} a_y t^2 = \frac{1}{2} (9.81 \text{ m/s}^2) (.534 \text{ s})^2$
 $= 1.40 \text{ m}$

(2)

③ $2.4 \text{ m} - 1.40 \text{ m} = 1.0 \text{ m}$ a) Yes it will
 pass over

b) Will it land in service court (6.4m from net?)
 d)

① $t = \sqrt{\frac{2y}{a_y}} = \sqrt{\frac{2(2.4 \text{ m})}{9.81 \text{ m/s}^2}} = .699 \text{ s}$

② $x = v_{0x} t = (22.3 \text{ m/s})(.699 \text{ s}) = 15.6 \text{ m}$

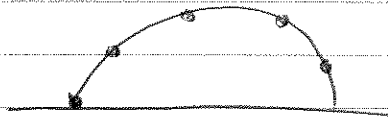
③ $15.6 \text{ m} - 11.9 \text{ m} = 3.7 \text{ m}$

c) Yes it will
 land in area

~~15.6~~
~~15.6~~

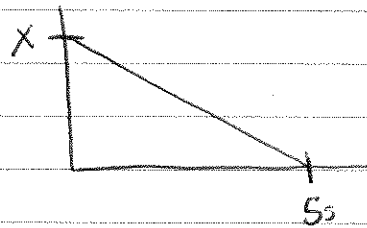
- Online Tutorial

Graphing Projectile Motion

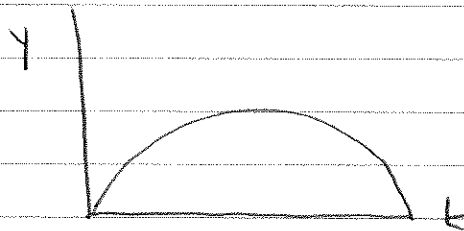


motion diagram
5 sec total

a) Position vs time $x(t)$



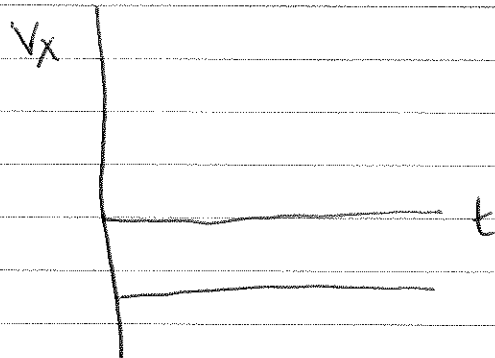
b) Position vs time $y(t)$



changing v , changing slope

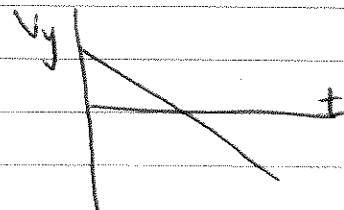
(1)

c) horizontal velocity vs time



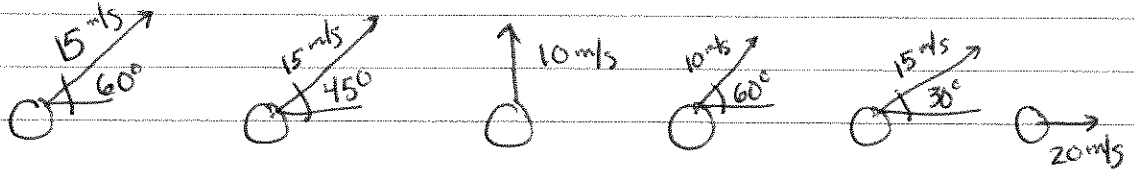
left is negative

d) vertical velocity vs time



Projectile Motion Ranking Task

A) Rank based on max height
(need largest v_{0y})



(2)

b) Rank based on t_{total}
(need largest v_{0y})

