

Name _____

Date _____

Advanced Algebra- Assignment #9

Chapter 9

Section 8.5 Projectile Motion- We are ignoring air resistance!

For all problems please do the following:

Draw the right triangle that is associated with the problem

Write the parametric Equations associated with the problems

1) A golfer swings a 7 iron club with an angle of 38 degrees with an initial velocity of 122 feet/second. He is on level ground.

- a) How long is the ball in the air? 4.69375 sec
- b) What is the maximum height that the ball reaches? 88.125 feet
- c) What is the x position at this maximum height? 2.346875 sec
- d) How much time elapses for the ball to get to the maximum height? *SAME*
- f) ~~What is the angle at which the ball lands?~~ How far did the ball land? 451 feet

2) Jo- Jo the circus boy is a human cannonball. He is fired out of a cannon 10 feet above the ground at a speed of 40 feet per second. The cannon is tilted at an angle of 60 degrees. His net hangs 5 feet above the ground.

- a) Where does his net need to be positioned (horizontal displacement) so that he will land safely? $46 \text{ feet from base}$
- b) How long is he in the air? 2.3 seconds
- c) What is the maximum height that he reaches? 28.75 feet
- d) What is the x position at this maximum height? 1.081 sec
- e) How much time elapses for him to get to the maximum height? *SAME*
- f) ~~What is the angle at which he lands?~~

3) A t-shirt is launched at a 62 degree angle. It has an initial velocity of 86 feet second. The height of the launch is 5 feet.

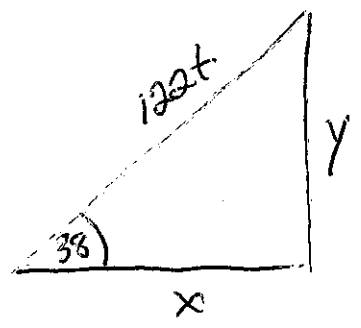
- a) How long is the t shirt in the air? *4.8 sec*
- b) What is the maximum height that the reaches? *95.08 feet*
- d) What is the x position at this maximum height? *2.4 sec*
- e) How much time elapses for him to get to the maximum height? *same*
- f) ~~What is the angle at which he lands?~~
- g) What is the horizontal distance at the t shirt travels. *193.8 feet*

Extension:

If you launch a ball at a particular angle and initial velocity, you can determine how far it will travel. Is there another angle at which a ball can be launched, with the same initial velocity, that will cause the ball to travel exactly the same horizontal distance?

Assignment #9

①



$$\sin 38 = \frac{y}{122t}$$

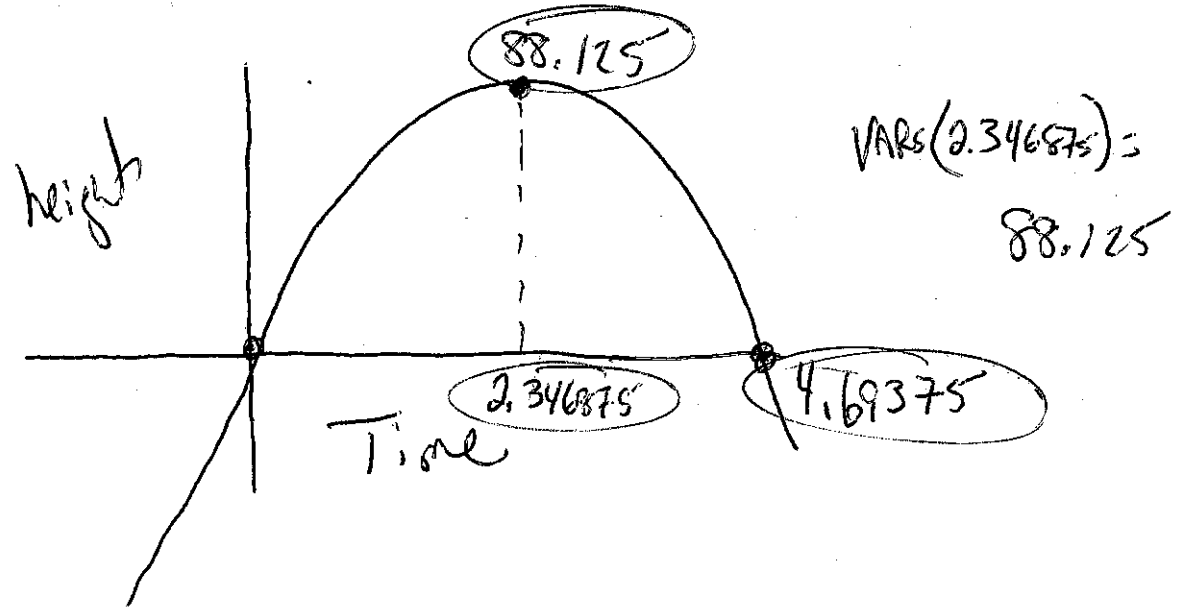
$$y = 122t \cdot \sin 38$$

$$x = 122t \cdot \cos 38$$

$$y = -16t^2 + 122t \cdot \sin 38 + 0$$

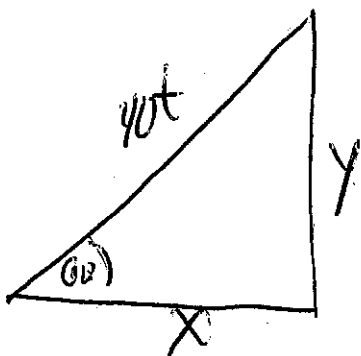
$$y = -16t^2 + 75.1 + 0$$

And 4.69375



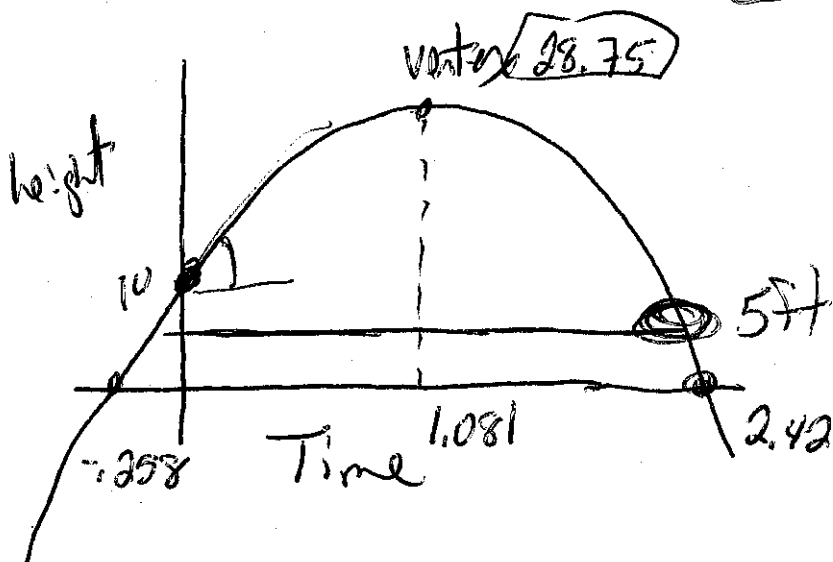
* How far $x = 122 (4.69375) \cos 38$
451 feet

2



$$y = -16t^2 + 40t \cdot \sin 60 + 10$$

$$x = 40t \cdot \cos 60$$



$$-16t^2 + 40t \cdot \sin 60 + 10 = 5$$

$$-16t^2 + 40t \sin 60 + 5 = 0$$

$$t = -0.135 \text{ and } 2.35 \text{ sec}$$

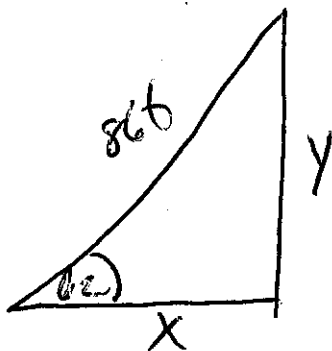
$$x = 40t \cdot \cos 60$$

$$t = 2.3$$

46 feet

place net 46 feet from base

3

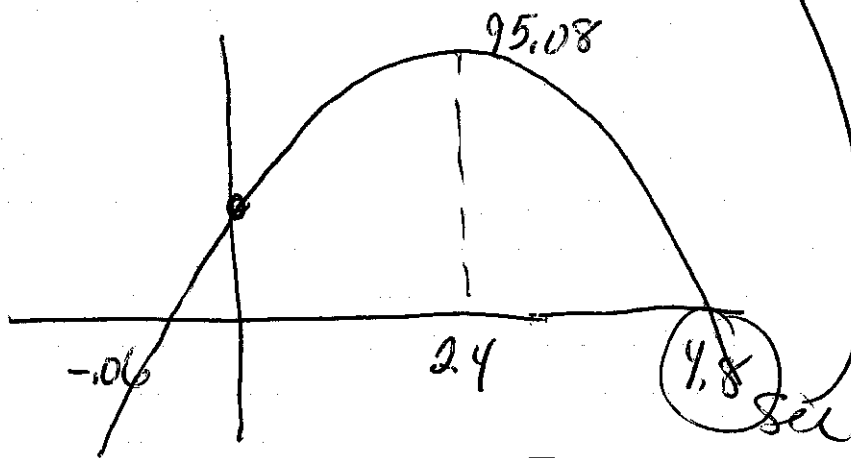


$$\sin 62 = \frac{y}{86t}$$

$$y = 86t \cdot \sin 62$$

$$x = 86t \cdot \cos 62$$

$$y = -16t^2 + 86t \cdot \sin 62 + 5$$



$$86(4.8) \cdot \cos 62 \quad 193.8 \text{ ft}$$

- How long 4.8 sec
- Max height 95.08 feet
- 2.4 sec
- 193.8 feet