Projectile Assignment Name _____

1. A stone is thrown horizontally at a speed of 5.0 m/s from the top of a cliff that is 78.4 m high.

$Y_{initial}$	$X_{initial}$	$V_{x\text{-}initial}$	a_x
			0 m/s^2
Y_{final}	X_{final}	$V_{y\text{-}initial}$	a_y
			-9.8 m/s^2

How long does it take the stone to reach the bottom of the cliff?	
Equation to Use	**Math / Solution**
Answer with Units	

How far from the base of the cliff does the stone hit the ground?	
Equation to Use	**Math / Solution**
Answer with Units	

Find the horizontal and vertical components of the stone's velocity just before it hits the ground. What is the final velocity?	
Equation to Use	**Math / Solution**
Answer with Units	

Projectile Assignment Name _____

2. A player kicks a football from ground level with an initial velocity of 27.0 m/s, 30.0° above the horizontal, as shown in Figure 6-4.Find each of the following. Assume that air resistance is

$X_{initial}$	**Initial Speed**	$V_{x\text{-}initial}$
X_{final}	**Initial Angle**	$V_{y\text{-}initial}$

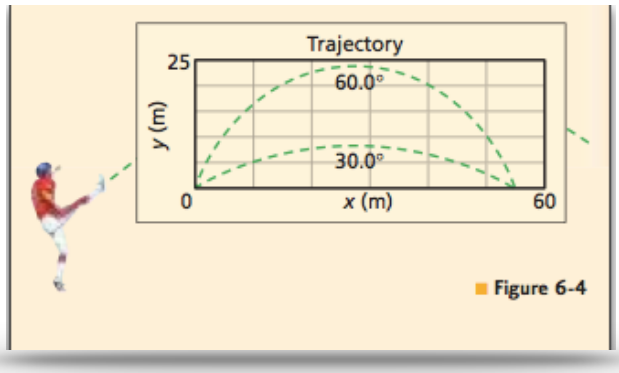


Figure 6-4

What is the ball's hang time?	
Equation to Use	**Math / Solution**
Answer with Units	

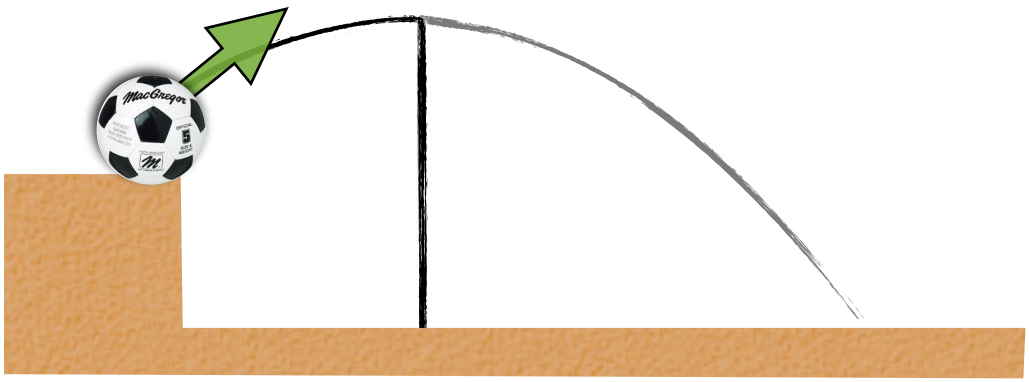
What is the ball's maximum height?	
Equation to Use	**Math / Solution**
Answer with Units	

What is the ball's range?	
Equation to Use	**Math / Solution**
Answer with Units	

negligible.

Projectile Assignment Name _____

3. A soccer ball is kicked from the top of a 180 m cliff with an initial velocity of 57 m/s at 39°.

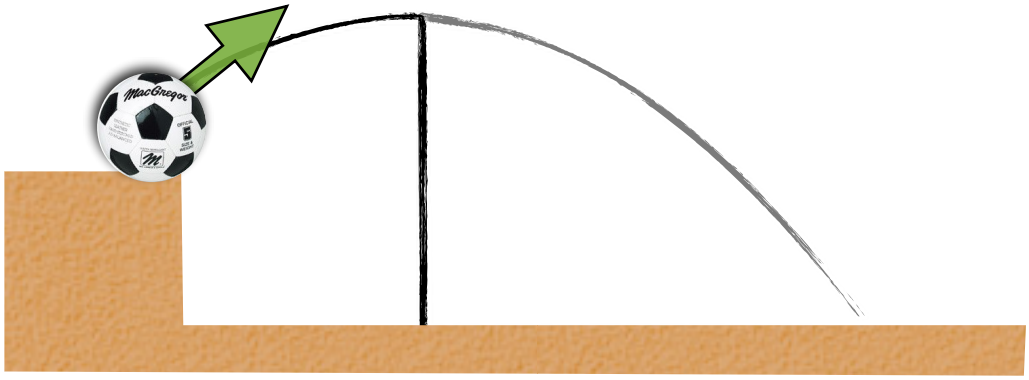


$Y_{initial}$	$X_{initial}$	**Initial Speed**	$V_{x\text{-}initial}$	a_x
				0 m/s²
Y_{final}	X_{final}	**Initial Angle**	$V_{y\text{-}initial}$	a_y
				-9.8 m/s²

Find the maximum height	
Equation to Use	**Math / Solution**
Answer with Units	

Find the time to the top, and to the ground	
Equation to Use	**Math / Solution**
Answer with Units	

(#3 continued)



Find the final Y velocity, and the resutltant velocity	
Equation to Use	**Math / Solution**
Answer with Units	

Find the range.	
Equation to Use	**Math / Solution**
Answer with Units	

4. Florence Griffith-Joyner of the United States set the women's world record for the 200 m run by running with an average speed of 9.37 m/s. Suppose Griffith-Joyner wants to jump over a river. She runs horizontally from the river's higher bank at 9.37 m/s and lands on the edge of the opposite bank. The difference in height between the two banks is 2.00 m.

Diagram-It

$Y_{initial}$	Initial Speed	$V_{x\text{-}initial}$	a_x
			0 m/s^2
Y_{final}	Initial Angle	$V_{y\text{-}initial}$	a_y
			-9.8 m/s^2

How long does it take her to reach the bottom of the cliff?

Equation to Use	Math / Solution
Answer with Units	

How wide is the river?

Equation to Use	Math / Solution
Answer with Units	

5. A marble rolls off the edge of a table that is 0.734 m high. The marble is moving at a speed of 0.122 m/s at the moment that it leaves the edge of the table. How far from the table does the marble land?

6. A downed pilot fires a flare from a flare gun. The flare has an initial speed of 250 m/s and is fired at an angle of 35° to the ground. How long does it take for the flare to reach its maximum altitude?

7. You accidentally throw your car keys horizontally at 8.0 m/s from a cliff 64-m high. How far from the base of the cliff should you look for the keys?

8. An arrow is shot at 30.0° above the horizontal. Its velocity is 49 m/s, and it hits the target.
   a. What is the maximum height the arrow will attain?
   b. The target is at the height from which the arrow was shot. How far away is it?

9. A busy waitress slides a plate of apple pie along a counter to a hungry customer sitting near the end of the counter. The customer is not paying attention, and the plate slides off the counter horizontally at 0.84 m/s. The counter is 1.38 m high.
   a. How long does it take the plate to fall to the floor?
   b. How far from the base of the counter does the plate hit the floor?
   c. What are the horizontal and vertical components of the plate's velocity just before it hits the floor?

10. A ball is thrown from a 20 m high roof with a speed of 10.0 m/s and an angle of 37.0° with respect to the horizontal.
    a. How far is the ball from the building 2.5 s after it is thrown?
    b. How far is the ball from the ground 2.5 s after it is thrown?

11. A tennis ball is thrown toward a vertical wall with a speed of 21.0 m/s at an angle of 40.0° above the horizontal. The horizontal distance between the wall and the point where the tennis ball is released is 23.0 m.
    a. At what height above the point of release does the tennis ball hit the wall?
    b. Has the tennis ball already passed the highest point on its trajectory when it hits the wall? Justify your answer.