Academic 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	

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2. 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.

$Y_{initial}$	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	

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3. 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 negligible.

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

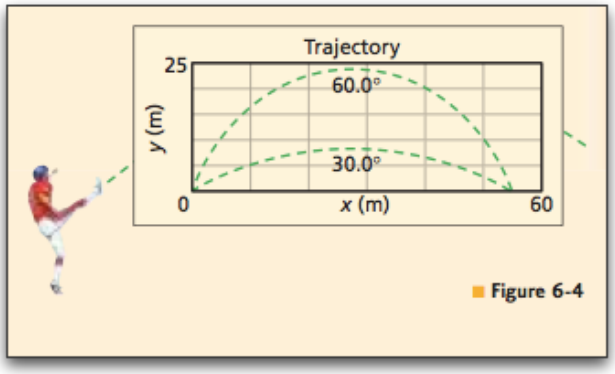

Figure 6-4

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	

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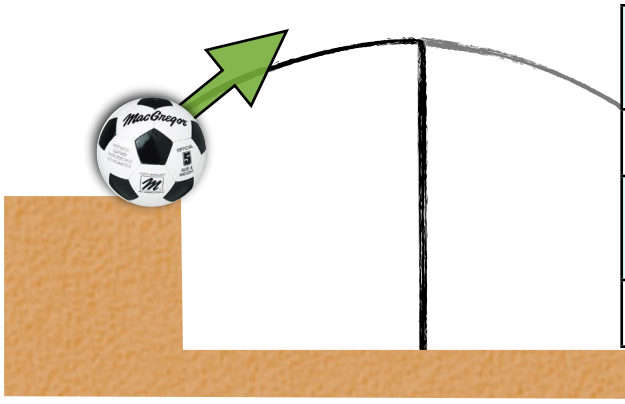
4. A soccer ball is kicked from the top of a 180 m cliff with an initial velocity of 57 m/s at 39°.



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

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	

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	

5. The longest shot on a golf tournament was made by Mike Austin in 1974. The ball went a distance of 471 m. Suppose the ball was shot horizontally off a cliff at 80.0 m/s. Calculate the height of the cliff.

6. The world's largest flowerpot is 1.95 m high. If you were to jump horizontally from the top edge of this flowerpot at a speed of 3.0 m/s, what would your landing velocity be?

7. A rock is thrown from a 50.0 m high cliff with an initial velocity of 7.0 m/s at an angle of 53.0° above the horizontal. Find the velocity vector for when it hits the ground below. (hint: find V_y at the bottom first - *not* the height)

8. 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?

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

10. 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?

11. 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?

12. 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?