Physics 2010

Mr. Hairston

2-D Projectile Motion #2

**Directions:** *On a SEPARATE sheet of paper, complete the following problems using the R.D.KUFS. problem-solving format. Show all of your work and circle your final answer.*

1. A plastic ball that is released with a velocity of 15 m/s stays in the air for 2.0 s.
   1. At what angle with respect to the horizontal was it released?
   2. What was the maximum height achieved by the ball?
2. An arrow was shot at an angle of 55º with respect to the horizontal. The arrow landed at a horizontal distance of 875 m. Find the velocity of the arrow at the top of its path.
3. A third baseman wishes to throw to first base, 127 feet distant. His best throwing speed is 85 mi/h.
   1. If he throws the ball horizontally 3 ft above the ground, how far from first base will it hit the ground?
   2. From the same initial height, at what upward angle must the third baseman throw the ball if the first baseman is to catch it 3 ft above the ground?
   3. What will be the time of flight in that case?
4. A projectile shot at an angle of 60o above the horizontal strikes a building 80 ft away at a point 48 ft above the point of projection.
   1. Find the initial velocity in ft/s
   2. Find the magnitude & direction of the velocity when it strikes the building in ft/s
5. A basketball player releases the ball 7 ft above the floor when he is 30 ft from the basket. The ball goes through the rim of the basket (which is 10 ft above the floor) 1.5 seconds after release.
   1. Find the initial velocity in ft/s
   2. Find the maximum height above the floor reached by the ball in feet.
6. A physics professor did daredevil stunts in his spare time. His last stunt was an attempt to jump across a river on a motorcycle. The takeoff ramp was inclined at 53.0 degrees the river was 40.0 m wide, and the far bank was 15.0 m lower than the top of the ramp. The river itself was 100 m below the ramp. You can ignore air resistance.
   1. What should his speed have been at the top of the ramp to have just made it to the edge of the far bank?
   2. If his speed was only half the value found in A, where did he land?
7. A pirate ship is defending the entrance of the harbor 560 m away from the fort on land. A defense cannon, located at sea level, fires balls at initial speed of 82 m/s.
   1. At what angle(s) from the horizontal must a ball be fired to hit the ship?