

Unit 2 Worksheet 5: Projectile Motion

1. Rachel Price grows up to be a stunt car driver. Her first task as a driver is to jump over as many cars as she can. Her 1970 Volkswagen bug can reach a top speed of 35mph (15.65 m/s). A) What angle (30, 45, or 60 degrees) should she set the ramp at to get the greatest range (change in x) and what is the range? She lands on an identical ramp on the other side of the cars. B) What angle should the ramp be to get the most hang time (time in the air)?
2. John-Cole Garwick decides to go out for the baseball team in 2010. He explains to the coach that he will be the best pitcher on the team. The distance from the home plate to the pitcher is 60.5 ft (18.44 m) and John-Cole releases the ball parallel to the ground from a height of 1 m. If John-Cole throws the ball at 40 m/s (89.5 mph . . . he has a cannon for an arm) will the ball cross the plate when thrown parallel to the ground?
3. Rachel is now doing her second stunt. She has to run out of a 10 story building which is 150 m tall and land in a pool that is 12 m from the edge of the building and extends out (length of pool) 8 m. Rachel is a slow runner so she can only run out the window at 5 mph (2.24 m/s). Will she make it into the pool or does she need to jump out the window at an angle?
4. Will Tucker is TRYING to play some basketball. What is the smallest angle Will needs to throw the ball at if the hoop is 6 ft (1.83 m) above his release point? He shoots the ball with a speed of 9 m/s.
5. Dohee An goes mountain biking at Squaw Peak Mountain. She is attempting to make it down the trail as fast as possible to make sure she gets first place. As she is romping down the mountain she notices a jump that could save her some valuable time. She hits the jump at an 18 degree angle above the horizontal and leaves the ramp with a speed of 18 m/s. A) How high will she get from her starting position on the jump? B) How fast vertically will she hit the ground if she lands 15 m below the jump? C) How far will she land from her starting position (her range)? D) What is her vertical speed, in mph, when she lands?