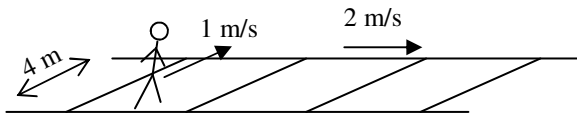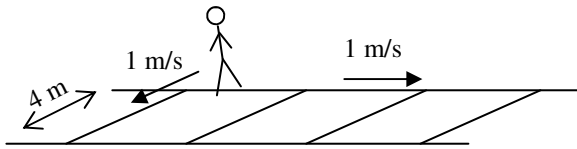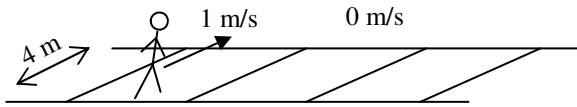# PreAP Two Dimensions 9

1. Slim Jim is crossing a moving sidewalk. Jim is walking 1 m/s directly across the sidewalk (perpendicular to it). If the sidewalk is NOT moving and is 4 m wide, how long does it take Jim to cross?

2. The sidewalk is then turned on and Slim Jim, always fascinated with physics, decides to walk back across the sidewalk. If the sidewalk is now moving 1 m/s, how long does it talk Jim to cross?

3. Once back to his original side, Jim notices that the sidewalk's speed has doubled to 2 m/s. So, back he goes. How long does it take for him to cross the 4 m wide sidewalk?

4. What is the real difference between his three journeys?

There are three basic kinds of projectile motion: I. Horizontally launched; II. Ground to ground; III. How high?

5. Which kind of projectile motion are these examples?

   A. ____ * A person is walking and drops an apple.
   B. ____ * A person bounces off a trampoline and onto another trampoline.
   C. ____ A rubber ball bounces off the ground. How high did it bounce?
   D. ____ The USS Missouri shoots its 16 in guns at another ship on the horizon.
   E. ____ A UN relief plane flying horizontally drops a care package.
   F. ____ A person runs off a cliff.
   G. ____ A person is riding on a moving flatcar of a train. They throw a ball straight up. How far have they moved when they catch it?
   H. ____ A person rolls a ball off a lab table.
   I. ____ Bolto the Human Cannonball is going to launch inside the big tent of a circus. Will he hit the top of the tent?

For the next three problems refer to "Two Dimensional Motion 8" for help.
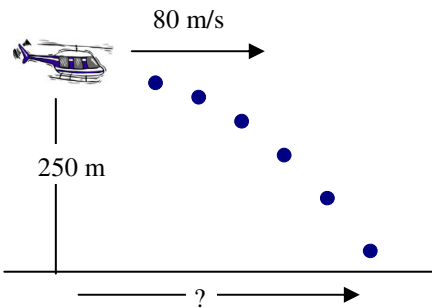
6. A helicopter is flying level, going 80 m/s at an altitude of 250 m. The plane then drops a brick.
   A. * How much time does it take for the brick to hit the ground (assuming no air friction)?

   B. How far from where he let go of the brick, does the brick land on the ground?
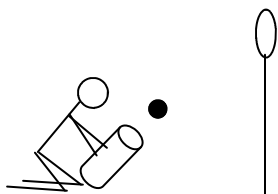
7. * Slim Jim shoots a ball going 12 m/s at an angle of 55°. At the top of the ball's path it passes thru a hoop. How high is the hoop off the ground?

6 m/s at 70°
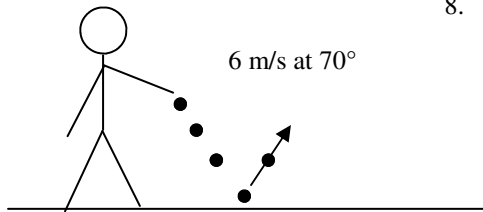
8. Slim Jim throws a ball at the ground. The ball then bounces from the ground and lands back on the ground. If its velocity is 6 m/s and its angle is 70°, find the range of the ball. (*How far away it lands.*)

5A) I—horizontally launched.
5B) II Ground to ground.
6A) 7.1 sec.   Viy = 0 m/s Δy = −250 m
7) 4.93 m