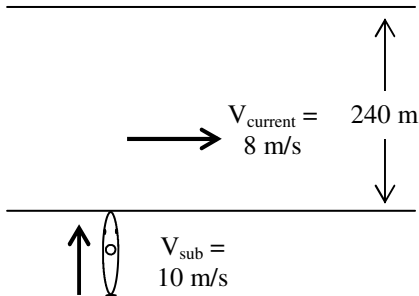


2011 PreAP Two Dimensions 12

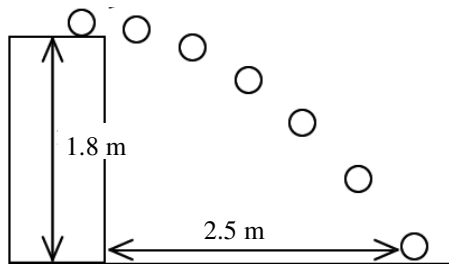
1. Which kind of projectile motion problem: I—horizontally launched; II—how high; III ground-to-ground?

- A. ____ A rock is launched from a sling shot going 15 m/s at 65° . The ceiling is 10 m tall. Does it hit the ceiling?
- B. ____ A bicyclist riding 8 m/s drops a rock from their hand, which is 0.8 m above the road. How far away does the rock land?
- C. ____ A rabbit hops 4.2 m/s at an angle of 30° with each hop. How far apart are the rabbit's hops?



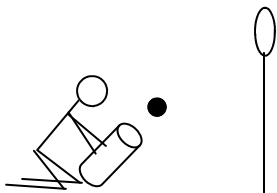
- 2. Let's use the sub and the deep ocean current again, but without all of the individual steps. You may refer to your previous homeworks, of course.
 - A. * By the time the sub has crossed the current, how far down stream (to the right) has the sub drifted?
 - B. What is the sub's resultant velocity as it crosses (mag and direction)?
 - C. * Calculate its angle to get straight across.

3. * A projectile is shot horizontally from the top of a 1.8 m tall table. It lands 2.5 m away. Calculate how fast it was shot.



4. And let's use Slim Jim and the hoop, again. This time Jim shoots at 3.5 m/s at an angle of 55° .

- A. * Calculate how far away the ball lands.



- B. So, obviously the hoop is half way, so what is the distance from Jim to the hoop in the x-direction (the x-coordinate of the hoop).
- C. The y-coordinate of the hoop is the highest point in the y-direction. So, calculate the highest point of the projectile.
- D. So, if the launch point is (0,0), what are the x, y coordinates of the hoop?

2A) 192 m 2C) 53.1° CW from straight ahead

3) $\Delta y = -1.8$ m; $V_{yi} = 0$ m/s; $t = 0.606$ sec; Since $S = D/T$, then $S = 2.5/0.606 = 4.125$ m/s.

4A) 1.18 m