PreAP Two Dimensions 12

2 m/s

3 m/s

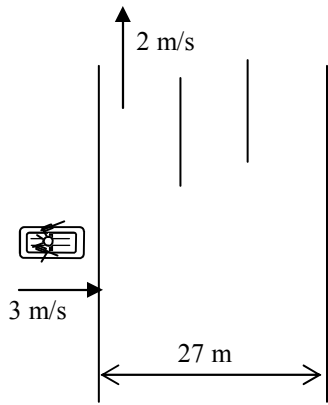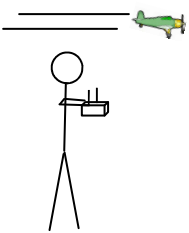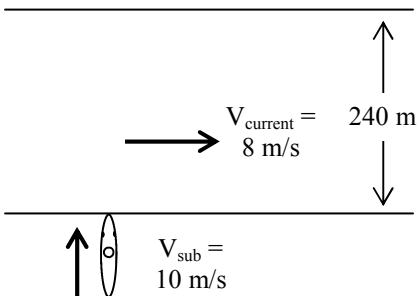**27 m**

1. While rowing his boat, Slim Jim comes across an ocean current that is 27 m wide.

   A. How fast would Jim be moving if he rowed with the current?

   B. How long does it take for him to get across the current?

   C. * How far does the current carry him (how far up)?

   D. *What is his resulting velocity in the current (and direction, of course)?

   E. *If he wanted to go straight across, what angle would he need to aim his row boat? (*Give your angle from east.*)

2. * Slim Jim is playing with his model airplane. The plane flies 8 m/s at direction of 75 degrees for 35 seconds. Then he turns the plane so that it is flying at a direction of 135 degrees for 18 seconds (at the same speed) until it runs out of fuel.

   A. How far (and in what direction) does the plane move in the first part of its flight?

   B. How far (direction, too) does the plane move in the second part of its flight?

   C. Now that you have displacement vectors instead of velocity vectors, how far (and at what direction) does Slim Jim have to walk to pick up his plane?

$V_{current} = $ 8 m/s   240 m

$V_{sub} = $ 10 m/s

3. * A submarine on patrol comes across an underwater canyon that has a consistent current flowing thru it directly west. (*I am going to skip some of the steps above, but you can refer to them in Q1 if you need to.*)

   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.

4. 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?

1C) 18 m   1D) 3.6 m/s at 33.7°   1E) −41.8°
2) x_{total} = −29.4 m y_{total} = 372.3 m   3) 33.9 m
4) 4.9 m