

**Description**

The left pair of input fields are specifying the speed and direction of the water (that is, the current), and the right pair is for the speed and direction of the swimmer. The direction is specified by the compass direction, so North is 0, East is 90, South is 180, one degree north of West is 271, etc.

**Instructions and Questions**

1. To get acquainted, have the water flow 3 knots Northeast (45 degrees on the compass), and point the swimmer Northwest (this is a relative angle, so 0 degrees is straight ahead... in this case type -45 degrees) with the same speed (3 knots). Press the start button to see if the swimmer goes north.
2. If something goes wrong, wait until the swimmer comes around again and press the stop button. If it is really messed up, reload (or refresh) the page to reset everything.
3. Keep the same speed of the current (3 knots) and Compass direction (45). Keep the swimmer also at 3 knots (the swimmer controls are on the right side). What direction makes the swimmer swim due south?
4. Now has the swimmer swim straight ahead (0 degrees is the direction). The water is now drifting him to the right. What is the vector that he's moving in?
5. The answer to the last question is actually the sum to two vectors: the water vector and the swimmer's vector. The magnitude of this vector is the speed the swimmer is actually moving. Is the water helping or hurting the swimmer's progress?
6. Now change the swimmer's speed to only 2 knots. Is the -45 degrees Direction enough to get the swimmer to swim north?
7. What is the angle that the swimmer is moving now?
8. What angle does the swimmer need to point to (the Direction value) so that he goes north when the current's speed is 3 and the swimmer's speed is only 2 (You have it perfect when the polar angle is 90 and the compass direction is 0)?
9. Draw the current vector, and draw the swimmer vector starting at the end of the current vector. The sum of the two is the vector that connects the beginning to the end... it should point straight up (north). Magnitude of this vector sum represents the speed traveling north. What is the speed?