Relative Motion

2/2 points earned (100%)

Retake

Next

Excellent!

1 / 1 points

1.
[#241] **Sailing – wind speed**

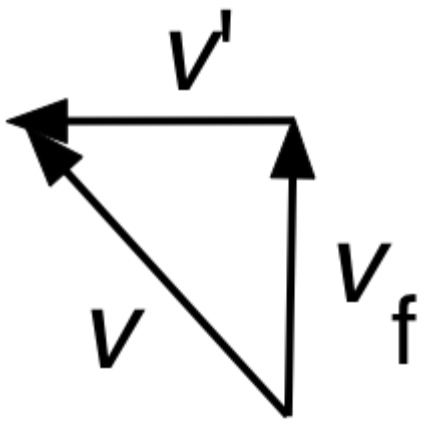
A sailor sailing due north at 5 knots observes an apparent wind moving at 5 knots directly from the boat's starboard (right hand) side, i.e. at 90° to the axis of the boat. What is the 'true' wind speed? (i.e. what is the speed of the wind with respect to the ground?).

The 'true' wind speed is _____ knots.

7

Correct Response

If v_f is the velocity of the boat with respect to the ground, and v' is the velocity of the wind w.r.t. the boat, then v is the velocity of the wind w.r.t. the ground. We write $v = v_f + v'$ and draw the vectors as follows:



Using the Pythagorean theorem, the magnitude of v' is simply $\sqrt{5^2+5^2} = 7\ \mathrm{knots}$ (to 1 sig fig). (By the way, a sailing boat is unlikely to sail this fast in a 7 knot breeze, so this is probably a motorboat, or a very high performance sailboat.)

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1 / 1 points

2.
[#242] **Sailing – wind direction**

A sailor sailing due north at 5 knots observes an apparent wind moving at 5 knots directly from the boat's starboard (right hand) side (i.e. at 90°)....

In the previous question you calculated the magnitude of the 'true' wind velocity. What is the direction of the 'true' wind?

Note: sailors and everyone else usually state the direction *from which* the wind blows, and we ask you to do so here.

- Northeast
- Southwest
- Northwest
- Southeast

Correct
This answer is correct.

- None of these
