

Name: _____ Block: _____

Relative Velocity

1. A river is flowing at a rate of $2 \frac{\text{m}}{\text{s}}$ to the south. Jack is swimming downstream (southward) at $2 \frac{\text{m}}{\text{s}}$ relative to the current, and Jill is swimming upstream (northward) at $2 \frac{\text{m}}{\text{s}}$ relative to the current.
 - (a) What is Jack's velocity relative to Jill?

 - (b) What is Jill's velocity relative to Jack?

 - (c) What is Jack's velocity relative to a stationary observer on the shore?

 - (d) What is Jill's velocity relative to a stationary observer on the shore?

2. A small airplane is flying due east at $125 \frac{\text{m}}{\text{s}}$. The wind is blowing toward the north at $40 \frac{\text{m}}{\text{s}}$. What is the airplane's speed and heading relative to a stationary observer on the ground?

3. A ship is heading 30° north of east at a velocity of $10 \frac{\text{m}}{\text{s}}$. The ocean current is flowing north at $1 \frac{\text{m}}{\text{s}}$. A man walks across the ship at $2 \frac{\text{m}}{\text{s}}$ in a direction perpendicular to the ship (30° west of north).

Add the velocity vectors by drawing them on the grid below to show the velocity of the man relative to a stationary observer. (*Note: you do not have to calculate the numerical value.*)

