

**MATH 7**  
**ASSIGNMENT 5: MORE VECTORS**

PROBLEMS

1. A ship is sailing east with speed 10 mph. A person is walking on the deck of the ship going north with speed of 3 mph. What is the velocity of this person relative to the shore? Write it as a vector in the coordinate system where  $y$  axis is pointing north, and  $x$  axis is pointing east.
2. Let  $A(x_1, y_1)$ ,  $B(x_2, y_2)$ ,  $C(x_3, y_3)$ ,  $D(x_4, y_4)$  be four vertices of a quadrilateral.
  - (a) Write a formula for vectors  $\overrightarrow{A_1B_1}$ ,  $\overrightarrow{D_1C_1}$ , where  $A_1, B_1, C_1, D_1$  are midpoints of sides  $AB, BC, CD, DA$  respectively.
  - (b) Prove that  $\overrightarrow{A_1B_1} = \overrightarrow{D_1C_1}$
  - (c) Prove that in any quadrilateral, midpoints of 4 sides form a parallelogram.