NAME ______________________________ DATE __________

Technology Activity

For use with pages 573–580

GOAL To use geometry software to solve a real-life problem

A boat leaves a dock represented on the coordinate axes as $(2, 2)$ and is headed east at 10 knots. A wind is blowing from the south at 4 knots. Find the boat's new speed and the angle at which the boat has been blown off course.

Activity

1. Turn on the coordinate axes and the grid. Adjust the grid scale to accommodate the problem situation.
2. Construct the boat's vector and the wind's vector.
3. Use the parallelogram rule to construct the sum vector.
4. Use appropriate software features to find the new speed (take into account the scale of the grid) and the angle at which the boat has been blown off course. Also find the slope of the sum vector.

Exercises

1. What is the boat's new speed?
2. At what angle was the boat blown off course?
3. If the wind's speed increased to 6 knots and the boat's speed remained at 10 knots, what would the new speed and new direction of the boat be?
4. What is the relationship between the slope of the sum vector and the angle at which the boat has been blown off course?

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Technology Activity Keystrokes

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TI-92

1. Turn on the coordinate axes and the grid. Adjust the grid scale to accommodate the problem situation.

   F8 9 (Set Coordinate Axes to RECTANGULAR and Grid to ON.)

   ENTER

   F1 1 (Place cursor on a point on *x*-axis; drag the point until the scale changes from 0.5 to 2.)

2. Construct the boat's vector and the wind's vector.

   F2 7 (Place cursor on (2, 2).) ENTER (Move cursor to (12, 2).) ENTER

   F2 7 (Place cursor on (2, 2).) ENTER (Move cursor to (2, 6).) ENTER

3. Use the parallelogram rule to construct the sum vector.

   F2 7 (Place cursor on (2, 6).) ENTER (Move cursor to (12, 6).) ENTER

   F2 7 (Place cursor on (12, 2).) ENTER (Move cursor to (12, 6).)

   ENTER

   F2 7 (Place cursor on (2, 2).) ENTER (Move cursor to (12, 6).) ENTER

4. Find the new speed (take into account the scale of the grid).

   F6 1 (Place cursor on a horizontal vector.) ENTER (Move cursor to sum vector.) ENTER

   F6 6 (10 ÷ (Use cursor to highlight the value of the horizontal vector.) ENTER) (Highlight the value of the sum vector.)

   ENTER ENTER (The result will appear on the screen.)

   Find the angle at which the boat has been blown off course (F6 3).

   Find the slope of the sum vector.

   F6 4 (Place cursor on sum vector.) ENTER

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Sketchpad

1. Turn on the coordinate axes and the grid. Choose **Snap to Grid** from the **Graph** menu. To change grid size, use the translate selection arrow tool to drag point *B*.
2. Construct the boat's vector and the wind's vector. Choose segment from the straightedge tools. Construct a segment from (2, 2) to (12, 2). Construct a segment from (2, 2) to (12, 6).
3. Use the parallelogram rule to construct the sum vector. Construct a segment from (2, 6) to (12, 6). Construct a segment from (12, 2) to (12, 6). Construct a segment from (2, 2) to (12, 6).
4. Find the new speed (take into account the scale of the grid). Choose **Calculate** from the **Measure** menu. Click (, enter 10, click ÷ , click the horizontal vector, click) click * , click the value of the sum vector, and click OK.

   Find the angle at which the boat has been blown off course. Use the selection arrow tool, to select the points that make up the angle.

   Choose **Angle** from the **Measure** menu.

   Find the slope of the sum vector. Use the selection arrow tool to highlight the sum vector. Choose **Slope** from the **Measure** menu.