

You will need graph paper for this exercise. Let one square = one mile.

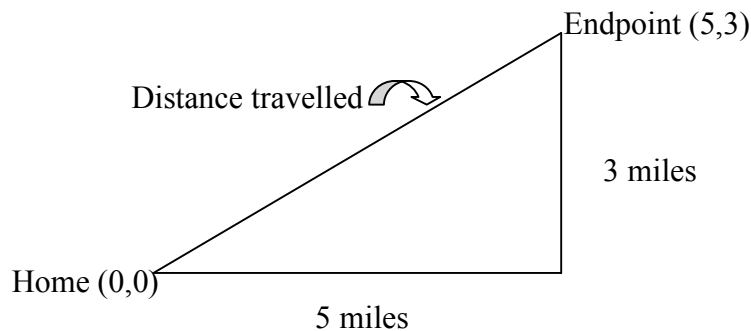
This problem is based on the story of Butch the Lost Dog, as told by John in the literacy update.

When Butch left home (home being the *origin* on the graph, or (0,0)), he followed a path with the following coordinates:

- | | |
|-----------|-----------|
| 1. (1,-2) | 7. (2,1) |
| 2. (1,-3) | 8. (1,2) |
| 3. (4,-3) | 9. (1,3) |
| 4. (5,-2) | 10. (2,4) |
| 5. (5,-1) | 11. (4,4) |
| 6. (4,0) | 12. (5,3) |

1. Plot the above coordinates and connect the dots. In what shape has Butch travelled?
2. How many miles away from home was Butch at the end of his travels? In order to answer this, let's introduce you to the Pythagorean Theorem.

Butch's final coordinates were (5,3). This means that he was 5 miles east and 3 miles north of his home. These distances can be shown graphically as a triangle, as follows:



In the diagram, the diagonal leg of the triangle (the distance travelled) is called the *hypotenuse* of the triangle. According to the Pythagorean Theorem, the hypotenuse is equal to the square root of the sum of the squares of the two other sides. That is,

$$\text{Hypotenuse} = \sqrt{[(\text{one side})^2 + (\text{the other side})^2]}$$

Using this equation, you can now calculate Butch's distance from home.

3. In what general direction from home should Rex head in order to find Butch? You have the following choices:
 - South by southeast
 - South by southwest
 - North by northeast
 - East by northeast
 - West by northwest