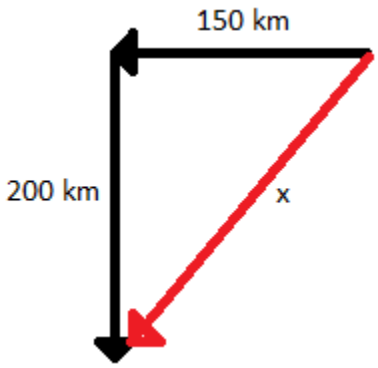
Name _____ Date _____

Vector Based Word Problems - Guided Lesson Explanation

Explanation #1

Step 1) First, you have to find the average velocity of the airplane.

Step 2) If you piece the two sightings together, you get:



Speed is a value that is determined by the distance travelled divided by the time taken. You need to find the distance travelled (x).To find x, you can use the Pythagorean Theorem.

$150^2 + 200^2 = x^2$

$22{,}500 + 40{,}000 = x^2$

$62{,}500 = x^2$

$\sqrt{62500} = x$

$x = 250$ km

To find the speed, you divide the distance covered (250 km) by the time it took (3 minutes or 180 seconds).

Speed = 250 ÷ 180 = 1.389

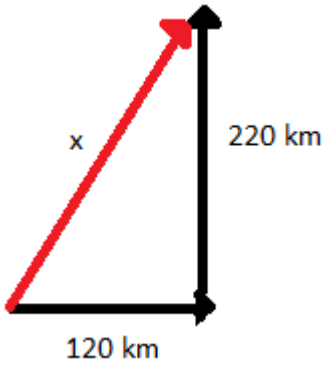
The units of measure are kilometers (distance) divided by seconds (time), or km/s.

Speed = 1.389 km/s

Name _____ Date _____

Explanation #2

If you place the two Ronny's sightings together, you get a right-angled triangle:



Speed is a value that is determined by the distance travelled divided by the time taken. The time taken is 2 minutes, you need to find the distance travelled (x). To find x, you can use the Pythagorean Theorem:

$120^2 + 220^2 = x^2$

$14{,}400 + 48{,}400 = x^2$

$62{,}800 = x^2$

$\sqrt{62800} = x$

$x = 250.60$ km

To find the speed, you divide the distance covered (250.59 km) divided by the time taken (i.e. 2 minutes = 120 seconds).

Speed = 250.60 ÷ 120 = 2.088

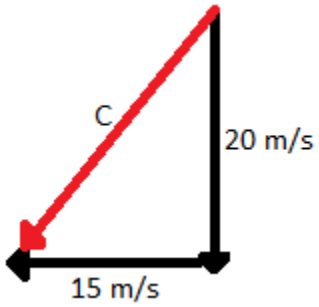
The units of measure are kilometers (distance) divided by seconds (time), or km/s.

Speed = 2.088 km/s

Name _____ Date _____

Explanation #3

Since the values given are due south and west, connecting the 2 endpoints creates a right-angled triangle.



The observer would be in the direction of the hypotenuse.

If you calculate the value of the hypotenuse, you will be able to gauge the velocity relative to his friend waiting at school. Both values are in meters per second, so your final answer will share the same unit of measure.

$15^2 + 20^2 = C^2$

$225 + 400 = C^2$

$625 = C^2$

$\sqrt{625} = C$

Answer: $C = 25$ m/s