

Vector Addition Worksheet

Name _____

Complete this while viewing the vector addition tutorial.

There are three trigonometric functions that are very useful in determining information concerning right triangles. A right triangle has one 90 degree angle in it. **Before you continue, do your best to memorize the following trigonometric functions:**

$$\text{Sine } \theta \equiv \frac{\text{opposite}}{\text{hypotenuse}} ; \quad \text{Cosine } \theta \equiv \frac{\text{adjacent}}{\text{hypotenuse}} \quad \text{Tangent } \theta \equiv \frac{\text{opposite}}{\text{adjacent}}$$

Pythagorean Theorem: $hyp^2 = opp^2 + adj^2$

1. Determine the right angle components of a 3 mile vector that points 30 degrees clockwise from North. Show your work. Include a diagram.
2. Determine the right angle components of a 4 mile vector that points 60 degrees clockwise from North. Show your work. Include a diagram.
3. Make a North-South, East-West grid and fill in the components determined in questions 1 and 2. Show your work. Include a diagram.

4. Determine the total of your North-South components and determine the total of your East-West components.

5. Draw a north-south, east-west grid and sketch the components. Then draw the resultant and determine its magnitude and direction. Show all work.

6. Another example. We are going to add 4.2 miles per hour at 80° to 8.2 miles per hour at 140° . Sketch the first vector onto a north-south, east-west grid and determine its right angle components.

7. Sketch the second vector onto a north-south, east-west grid and determine its right angle components.

8. Enter all of your components into a north-south, east-west table. Add up the columns. You should have -5.5 mi/hr in the north-south column and 9.41 mi/hr in the east-west column.

9. Draw another north-south, east-west grid and add 5.5 mi/hr South to 9.41 mi/hr East. Show your work. Include a diagram.

10. We will now use the Pythagorean theorem to determine the magnitude of the resultant vector. The theorem states that: $\text{hypotenuse}^2 = \text{opposite}^2 + \text{adjacent}^2$. Therefore the sum of two right angle components can be determined as follows: $\text{hypotenuse} = \sqrt{\text{opp}^2 + \text{adj}^2}$. Use this rule to determine magnitude of the sum of the South and East components. Show your work. Include a diagram.

11. Use tangent to determine the angle between the resultant answer and the South direction. Show your work. Include a diagram.

12. Why is the bearing of the answer @121° and not 59.5°?