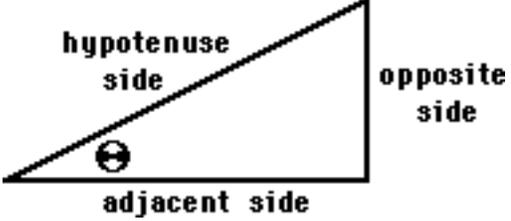


### Vector Addition by Components

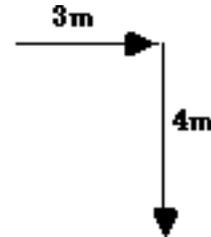
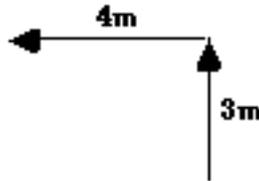
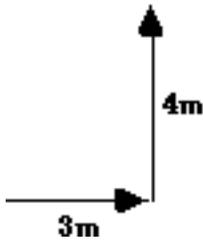
Read from **Lesson 1** of the **Vectors and Motion in Two-Dimensions** chapter at **The Physics Classroom**:

<http://www.physicsclassroom.com/Class/vectors/u3l1eb.cfm>

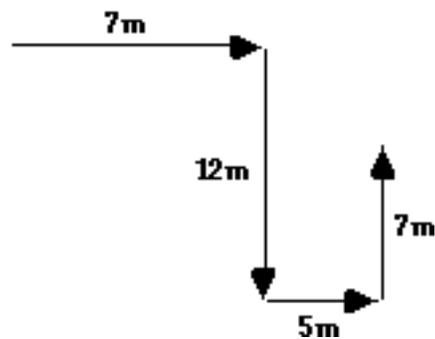
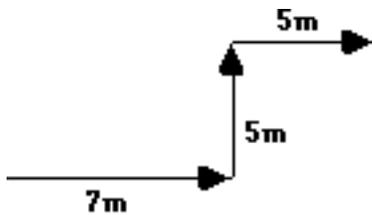
**MOP Connection:** Vectors and Projectiles: sublevels 3 and 4

 <b>TIP</b> Trigonometry Review	Trigonometric functions are mathematical functions that relate the length of the sides of a right triangle to the angles of the triangle. The meaning of the functions can be easily remembered by the mnemonic <p style="text-align: center;"><b>SOH CAH TOA</b></p>	
$\text{SOH} \rightarrow \sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}} \qquad \text{CAH} \rightarrow \cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}} \qquad \text{TOA} \rightarrow \tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$		

1. For the following vector addition diagrams, use Pythagorean Theorem to determine the magnitude of the resultant. Use SOH CAH TOA to determine the direction. **PSAYW**

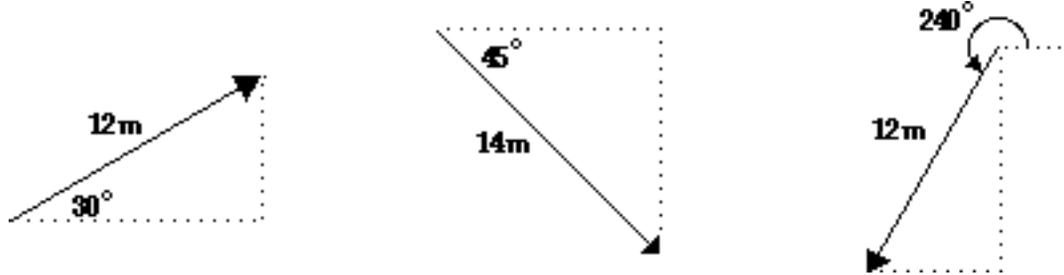


2. Use the Pythagorean Theorem and SOH CAH TOA to determine the magnitude and direction of the following resultants.



## Vectors and Projectiles

3. A component is the effect of a vector in a given x- or y- direction. A component can be thought of as the projection of a vector onto the nearest x- or y-axis. SOH CAH TOA allows a student to determine a component from the magnitude and direction of a vector. Determine the components of the following vectors.



4. Consider the following vector diagrams for the displacement of a hiker. For any *angled* vector, use SOH CAH TOA to determine the components. Then sketch the resultant and determine the magnitude and direction of the resultant.

