Name: _____

1. Given one specification of a vector, change to the others.

    a. If a vector **A** has components, $A_x = 7$ and $A_y = -4$, find the magnitude A and the angle θ and graph the vector **A**.

    b. If the magnitude of **B** is $B = 20$ and the angle $\theta = 190°$, find the x- and y-components, B_x and B_y and graph the vector **B**.

2. Using the vectors in problem 1, algebraically find the sum (resultant) of the two vectors, $\mathbf{A} + \mathbf{B}$, the difference **A** - **B** and graph **A**, **B**, **A+B** and **A-B**.

3. A boat travels 20° north of west for 10 miles, then to change course to 60° north of east for the next 5 miles. Find the final x- and y-components, displacement and angle of the boat relative to where it began.

4. Use the law of cosines and the law of sines to solve this ABCabc triangle for the remaining side and angles.

   a = 20.0 m,   B = 50°,   c = 28.0 m

5. In widening a highway, it is necessary for a construction crew to cut into the bank along the highway. The present angle of elevation of the straight slope of the bank is 23.0°, and the new angle is to be 38.5°, leaving the top of the slope at its present position. If the slope of the present bank is 220 feet long, how far horizontally into the bank at its base must they dig?