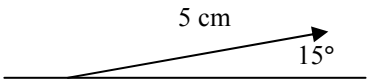
Name:_____ Date:_____

Mr. Croom's Physics Chapter 3: Two Dimensional Motion

Vector Components

Calculate the x and y components of each vector. Remember to use the angles in polar coordinates.

1.



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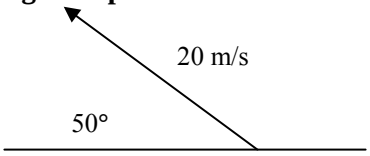

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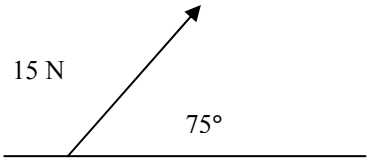

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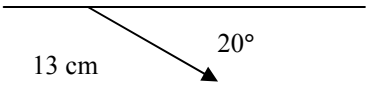

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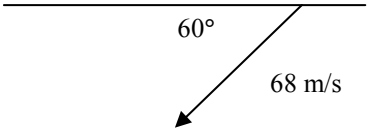

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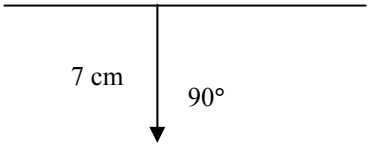
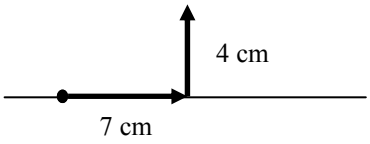


Calculate the magnitude and the polar coordinate angle based on the x and y components of each resultant vector.

7.



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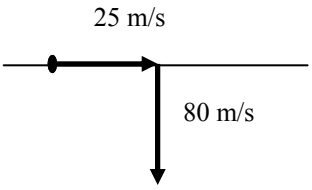

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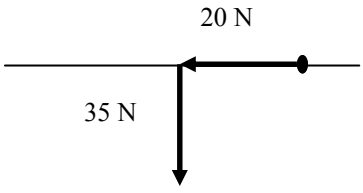

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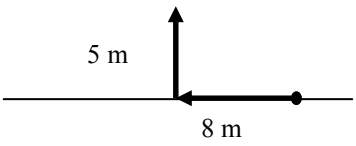

Solve the following problems.

1. The rectangular coordinates of a particular field vector F are (3 m, 4 m). What are the polar coordinates of this displacement vector? (First, draw this vector in a normal Cartesian coordinate system, then determine the polar coordinate attributes.)

2. A vector W has an x-component of – 25 units and a y-component of 40 units. Find the magnitude and direction of this vector.

3. A dog pulls a sled with a force of 200 N at an angle of 40° above the horizontal. What are the vertical and the horizontal components of this force? Express this vector in vector notation and as an ordered pair

4. A force of 300 lbs is applied at an angle of 72° above the horizontal. Resolve this into vertical and horizontal components. Express this vector in vector notation and as an ordered pair

5. The polar coordinates of a point are r = 8.2 m and $\theta = 210°$. What are the Cartesian coordinates of this vector?

6. The Cartesian coordinates of a vector are (4.5m, 7m). What are the polar coordinates?

7. A vector has the Cartesian value of -8 $\hat{i}$ + 13$\hat{j}$. Find the magnitude and direction of this vector.

8. A car is accelerating at $(4\hat{i} - 4\hat{j})\frac{m}{s^2}$ what is its acceleration in polar coordinates

9. Find the magnitude of a vector whose x, y, and z components are 11, 5, and 3. (Look back to see how to find displacement in 3 dimensions).

10. A displacement vector has an x-component of 25 m/s. If the vector is at an angle of 30° , what is the magnitude of the y-component?

11. An airplane while taking off has a velocity of 110 m/s. If the angle of takeoff is 6□, what are the vertical and horizontal components of the plane's velocity? Express this vector in both forms.

12. A speedboat is traveling directly *northeast*. How fast is it traveling if the northern component of its velocity is 30 m/s?