**Vector Addition and Resolution**

Use the displacement vectors given in the diagram (scale is in meters) below to answer the following:



Evaluate the following. Draw the vectors in head to tail configuration on a coordinate plane. Find the magnitude of the resultant and the direction as an angle relative to an axis.

|  |  |
| --- | --- |
| $$\rightharpoonaccent{R}=\rightharpoonaccent{A}+\rightharpoonaccent{D}$$ | $$\rightharpoonaccent{R}=\rightharpoonaccent{C}+\rightharpoonaccent{B}$$ |
| $$\rightharpoonaccent{R}=\rightharpoonaccent{A}-\rightharpoonaccent{D}$$ | $$\rightharpoonaccent{R}=2\left(\rightharpoonaccent{D}\right)+\rightharpoonaccent{C}$$ |
| $$\rightharpoonaccent{R}=\rightharpoonaccent{B}+\rightharpoonaccent{C}+\rightharpoonaccent{D}$$ | $$\rightharpoonaccent{R}=\rightharpoonaccent{A}-\rightharpoonaccent{D}+\rightharpoonaccent{C}$$ |
| $$\rightharpoonaccent{R}=\rightharpoonaccent{A}-\rightharpoonaccent{B}+\rightharpoonaccent{D}$$ | $$\rightharpoonaccent{R}=\rightharpoonaccent{D}-\rightharpoonaccent{B}-\rightharpoonaccent{C}$$ |

2. Resolve each vector into its x and y components.

|  |  |
| --- | --- |
|  a) | b)  |
|  |  |
| c)  | d)  |

3. Solve each problem using vector addition or resolution. Draw a vector diagram of each situation on a coordinate plane.

|  |  |
| --- | --- |
| a) A man walks 3.5 km to the east and then 4.5 km to the north. What is his resultant displacement from his original location? | b) An airplane flies 85.0 km on a heading 35.0° east of south. How far east did the plane fly and how far south did the plane fly? |
| c) An airplane flies due north with an airspeed (speed relative to the air) of 85 m/s. The wind is blowing east with a speed of 7.0 m/s. What is the velocity of the plane relative to the ground? | d) A man rows his boat across a lake such that he travels at a velocity of 4 m/s along a line that is 60° west of north. What is the component of his velocity directed to the north? |