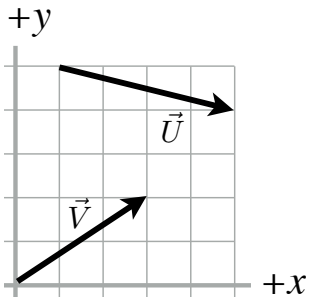
**Trigonometry and Vector Decomposition**

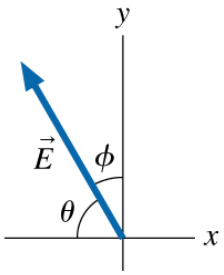
1. Two position vectors, ***U*** and ***V***, are superimposed on a grid. Each square is one meter long and one meter wide. Write each vector as a coordinate pair $\boldsymbol{A} = (A_x, A_y)$, using +/– signs for direction.



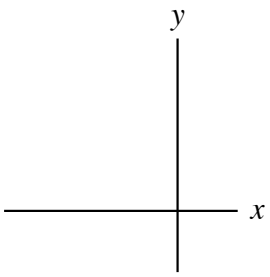

$\vec{U}$ =

$\vec{V}$ =

2. The vector ***E*** in the figure has a magnitude of 10 m, and the angle $\theta = 60°$.



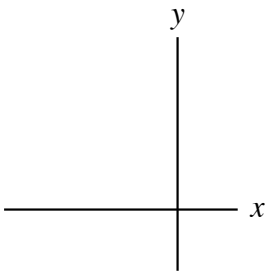

   a. Draw a triangle using $E$ as the hypotenuse and $\theta$ as one of the angles. Then, sketch the vector components $E_x$ and $E_y$.




   b. What is the magnitude (size or amount) of $E_x$? **First** write it in terms of $E$ and a function of the angle $\theta$, **then** calculate the value. Include units at every step of the calculation.

   c. What is the magnitude (size or amount) of $E_y$? **First** write it in terms of $E$ and a function of the angle $\theta$, **then** calculate the value. Include units at every step of the calculation.

d. Draw a triangle using $E$ as the hypotenuse and $\phi$ as one of the angles.
Then, sketch the vector components $E_x$ and $E_y$.




e. What is the magnitude (size or amount) of $E_x$? **First** write it in terms of $E$ and a function of the angle $\phi$, **then** calculate the value. Include units at every step of the calculation.

f. What is the magnitude (size or amount) of $E_y$? **First** write it in terms of $E$ and a function of the angle $\phi$, **then** calculate the value. Include units at every step of the calculation.

g. How does the value of $E_x$ in part b compare with the value of $E_x$ in part e?

h. How does the value of $E_y$ in part c compare with the value of $E_y$ in part f?