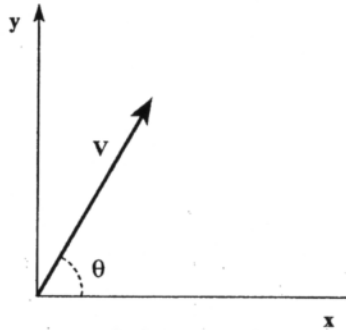


Tutorial on vectors and vector addition

In this course it is very important that you have confidence in summing vectors, both geometrically and analytically. This worksheet will help you review vectors and vector sums. If you have any trouble answering the questions below, make sure to review the relevant material from Phy 211 and consult your workshop instructor to clarify any questions you may have.

1. A vector \mathbf{V} makes an angle θ with the horizontal (x axis).



- (a) Write an expression for the component of \mathbf{V} in the horizontal direction (also called x component, V_x).
- (b) Write an expression for the component of \mathbf{V} in the vertical direction (also called y component, V_y).
- (c) Assume that $\theta = 60^\circ$ and that the magnitude of \mathbf{V} is 8 units. Find the values of V_x and V_y .

(d) Show on the figure the geometrical construction that gives the answer to (a) and (b) above.

2. A particle is subject to two forces \mathbf{F}_1 and \mathbf{F}_2 , given by

$$\mathbf{F}_1 = 2\mathbf{i} + 3\mathbf{j}, \quad \mathbf{F}_2 = 4\mathbf{i} - \mathbf{j}.$$

Find the net force \mathbf{F} on the particle. Give your answer in terms of the unit vectors \mathbf{i} and \mathbf{j} . Also find the magnitude of \mathbf{F} and the angle that \mathbf{F} makes with the $+x$ axis.

3. Find the net force on the particle by using a geometrical construction.