

## Trig 8.1

Find equal, opposite and parallel vectors  
Add and subtract vectors geometrically  
Find horizontal and vertical components of vectors

vector

magnitude

standard position

direction

zero vector

equal vectors

resultant

opposite vectors

scalar quantity (scalar)

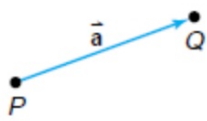
parallel vectors

components

tip-to tail (triangle) method

parallelogram method...BOO

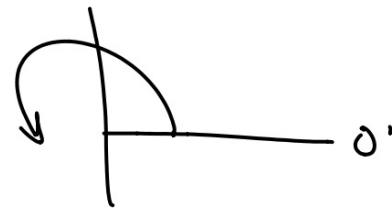
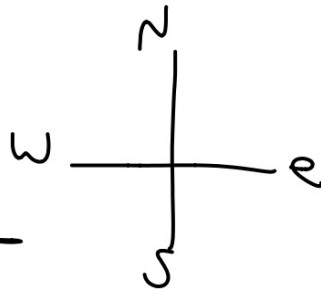
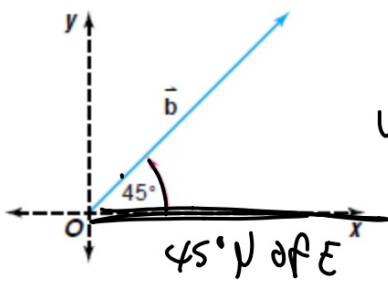
*One picture is worth 1000 words.*



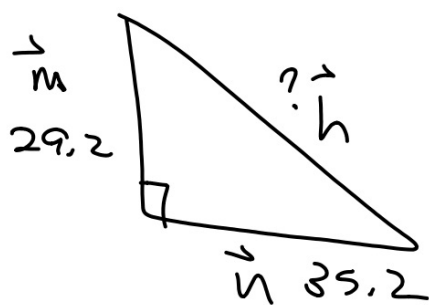
magnitude

standard position

direction

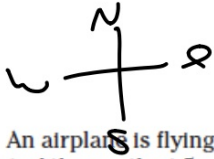


35. The magnitude of  $\vec{m}$  is 29.2 meters, and the magnitude of  $\vec{n}$  is 35.2 meters. If  $\vec{m}$  and  $\vec{n}$  are perpendicular, what is the magnitude of their sum?



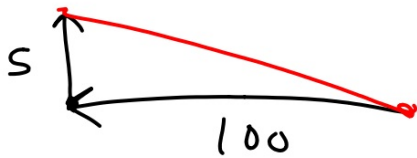
$$(29.2)^2 + (35.2)^2 = h^2$$

$$2091.68$$
$$\vec{h} = 45.7$$



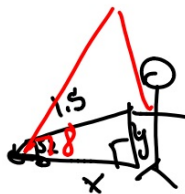
13. **Aviation** An airplane is flying due west at a velocity of 100 m/s. The wind is blowing out of the south at 5 m/s.

- Draw a labeled diagram of the situation.
- What is the magnitude of airplane's resultant velocity?



40. Toys Belkis is pulling a toy by exerting a force of 1.5 newtons on a string attached to the toy.

- The string makes an angle of  $52^\circ$  with the floor. Find the vertical and horizontal components of the force.
- If Belkis raises the string so that it makes a  $78^\circ$  angle with the floor, what are the magnitudes of the horizontal and vertical components of the force?



$$\cos 52 = \frac{x}{1.5} \quad 0.92N = \vec{h}$$

$$\sin 52 = \frac{y}{1.5} \quad 1.18N = \vec{v}$$

$$\cos 78 = \frac{x}{1.5}$$

$$\sin 78 = \frac{y}{1.5}$$

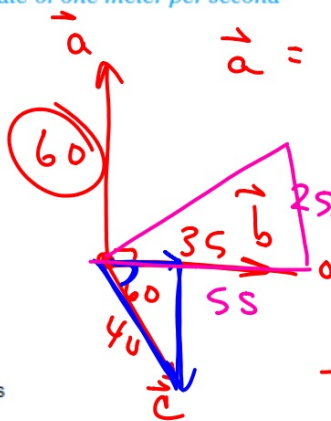
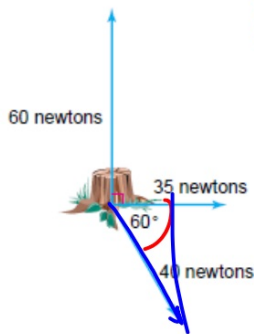
$$\vec{h} = 0.31N$$

$$\vec{v} = 1.47N$$

Force diagram  
Component form  
Standard position

38. **Physics** Three workers are pulling on ropes attached to a tree stump as shown in the diagram. Find the magnitude and direction of the resultant force on the tree. A newton (N) is a unit of force used in physics. A force of one newton will accelerate a one-kilogram mass at a rate of one meter per second squared.

"force diagram"  
component form  
angle in std position



$$\vec{a} = x = 60 \cos 90 = 0$$

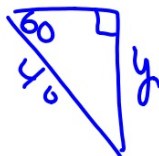
$$y = 60 \sin 90 = 60$$

$$\vec{b} = x = 35 \cos 0 = 35$$

$$y = 35 \sin 0 = 0$$

$$\vec{c} = x = 40 \cos 60 = 20$$

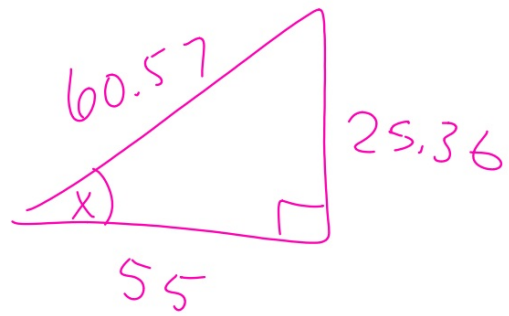
$$y = 40 \sin 60 = 34.64$$



$$mag = 60.57 N$$

$$dir = 25^\circ$$

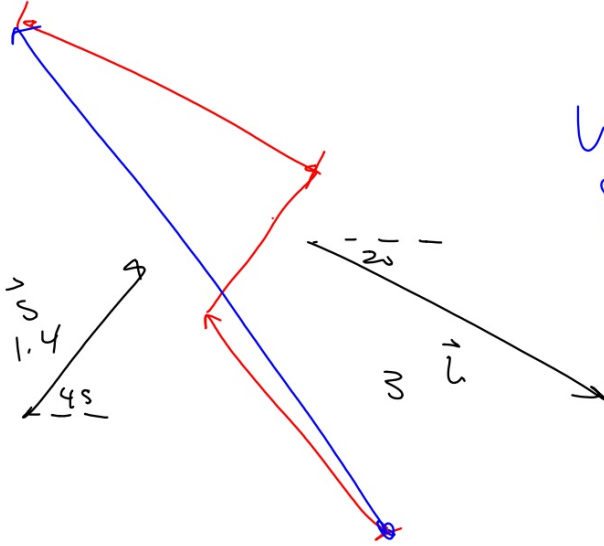
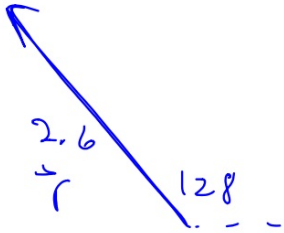
$$\begin{array}{l} h \\ \text{SS} \end{array} \quad \begin{array}{l} v \\ 25.36 \end{array}$$



$$\tan x = \frac{25.36}{55}$$

491

$$\vec{r} + \vec{s} + \vec{u}$$



WB  
8.1