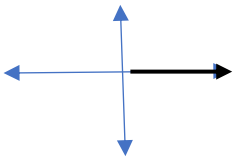
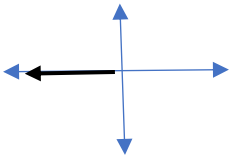
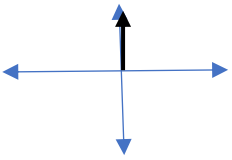
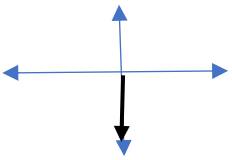
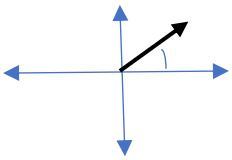
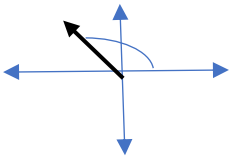
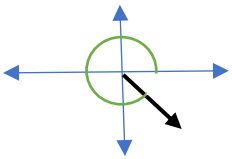
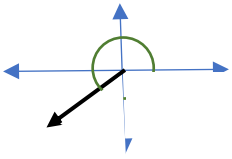
TSC | LEARNING COMMONS

Vector Interpretations

Basic directional vectors are always of the form <horizontal change, vertical change>, or (x component, y component>. Keep in mind east is in the x direction, west is the -x direction, north is in the y direction and south is the -y direction.

Examples of moving 5 miles in each direction:

Direction	Graph	Vector Set-up
East 5 →		<5,0>
West 5 →		<-5,0>
North 5 →		<0,5>
South 5 →		<0,-5>
Northeast 5 →		<5cos(45°), 5sin(45°)>
Northwest 5 →		<5cos(135°), 5sin(135°)>
Southeast 5 →		<5cos(315°), 5sin(315°)>
Southwest 5 →		<5cos(225°), 5sin(225°)>

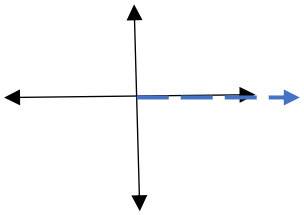
Example:

You start at home and take a morning walk. You follow the path of:

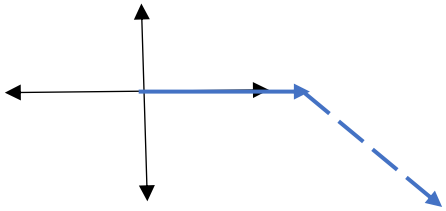
5 miles east
10 miles southeast
3 miles south
2 miles southwest

Let's draw the picture and break each step into components.

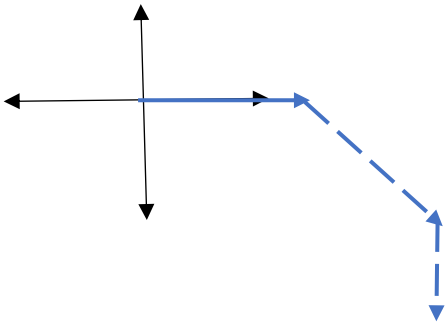
5 miles east



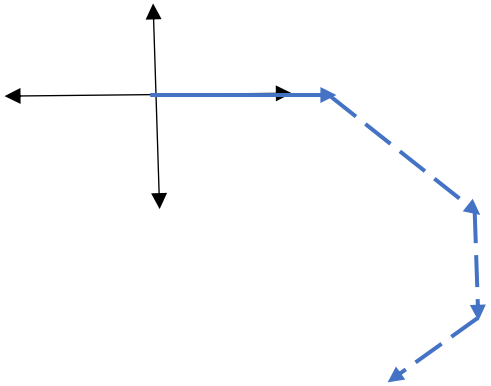
10 miles southeast



3 miles south



2 miles southwest



a) How far did you walk: 5 + 10 + 3 + 2 = 20 miles

	Horizontal component(x)	Vertical component(y)
5 miles east	5	0
10 miles southeast	10cos(315°)	10sin(315°)
3 miles south	0	-3
2 miles southwest	2cos(225°)	2sin(225°)
Resultant(sum)	**10.657**	**-11.485**

b) Displacement vector: <10.657, -11.485>

c) Magnitude: $\sqrt{(10.657)^2 + (-11.485)^2}$= 15.67 miles from home if you walk back on a straight line