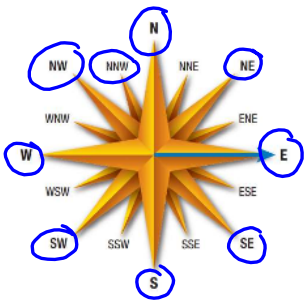
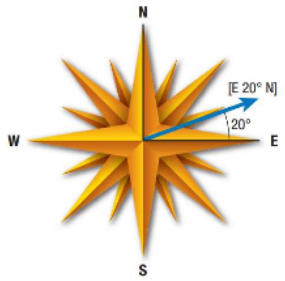
SPH3U: 2.1 Motion in Two Dimensions – Scale Diagrams

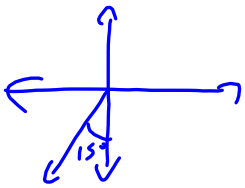
1. Compass directions

Compass:	North, South, East, West. (NESW).
compass rose	cross that shows directions (below).
Cartesian grid	N: +y, E: +x, S: -y, W: -x.
angles between NEWS	[E20°N], [N70°E], etc.

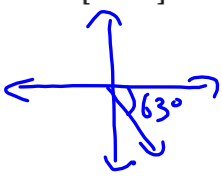




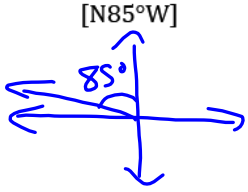
[S15°W]



[E63°S]

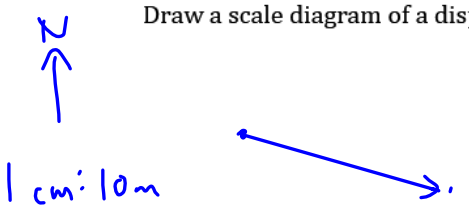


[N85°W]



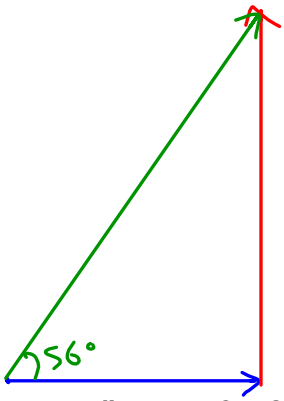
Scale diagram:	accurate drawing of a situation.
scale	a ratio between the size of your drawing and the size in real life. ex: 1cm : 10km.
resultant vector	the result of adding vectors.

Draw a scale diagram of a displacement vector of 41 m [E15°S].



Tip and tail:	tip: front of arrow, tail: back of arrow.
Adding vectors:	tip-to-tail: draw a scale diagram with vectors connected tip-to-tail.

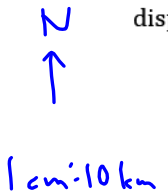
A cyclist rides her bicycle 50 m due east, and then turns a corner and rides 75 m due north. What is her total displacement?

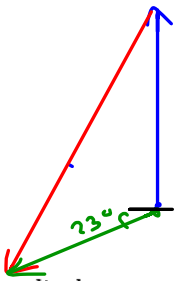


8.9cm → 89m.

$\therefore \vec{\Delta d} = 89\text{m}\ [E\,56°N]$.

While in a race, a sailboat travels a displacement of 40 m [N]. The boat then changes direction and travels a displacement of 60 m [S30°W]. What is the boat's total displacement?





3.2cm → 32m.

$\therefore \vec{\Delta d} = 32\text{m}\ [W23°S]$

A squash ball undergoes a displacement of 6.2 m [W25°S] as it approaches a wall. It bounces off the wall and experiences a displacement of 4.8 m [W25°N]. The whole motion takes 3.7 s. Determine the squash ball's total displacement and average velocity.

Homework: page 65: #1-4, 7-8