

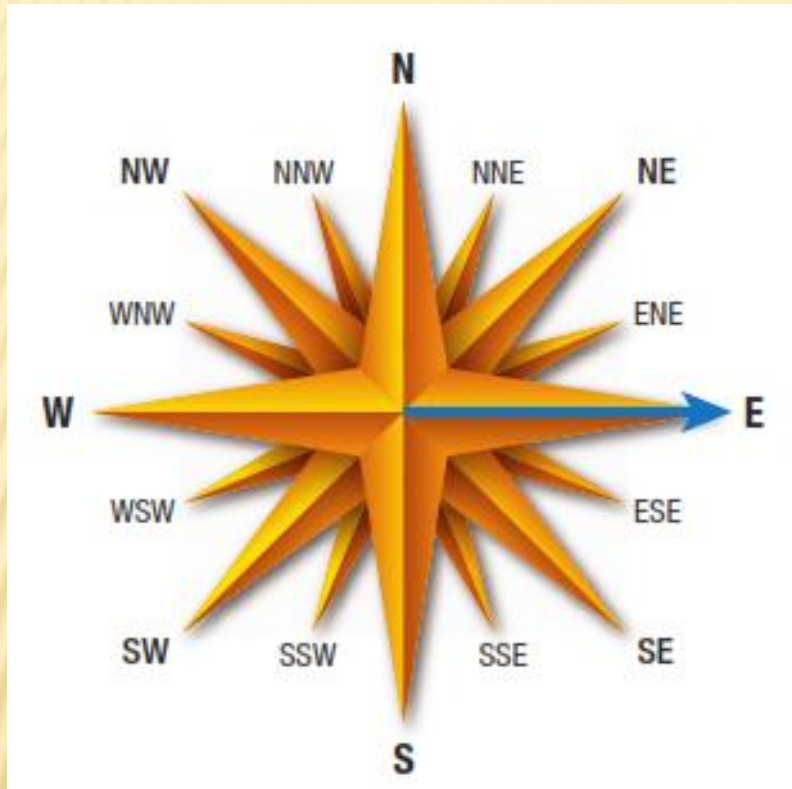
SPH3U – Motion in 2 Dimensions

SCALE DIAGRAM AND ALGEBRAIC APPROACHES

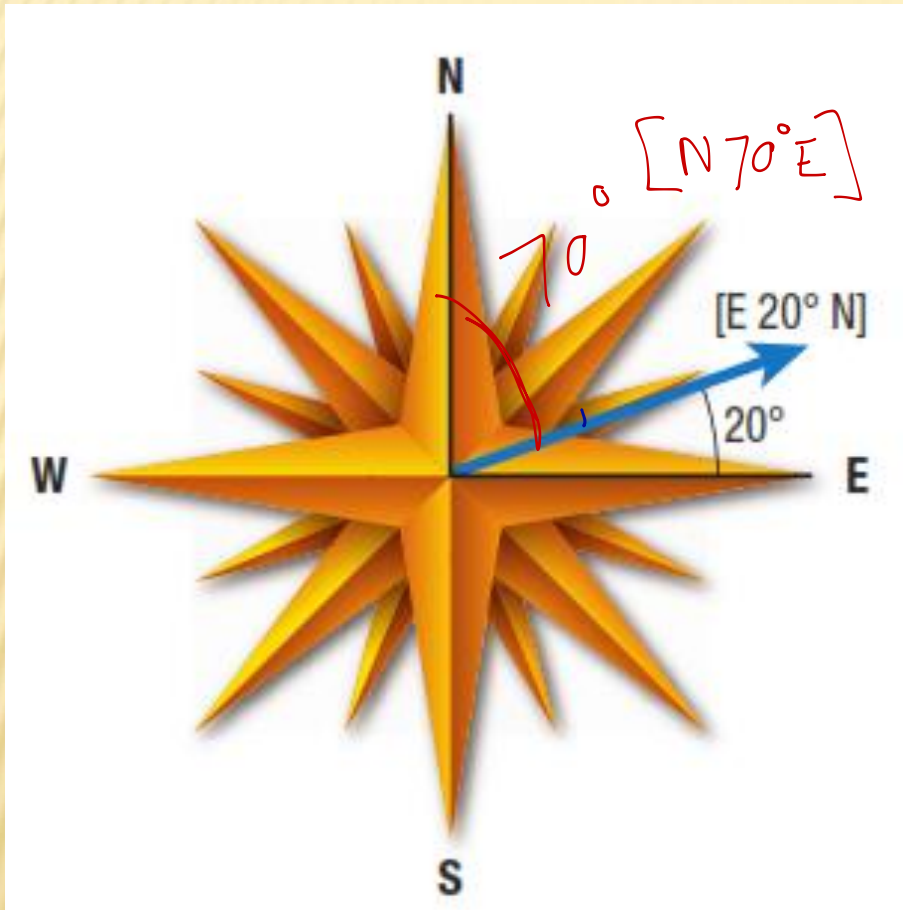
TWO DIMENSIONAL MOTION

- ✘ Objects can move in two dimensions, such as in a horizontal plane and a vertical plane
- ✘ A compass rose can be used to express directions in a horizontal plane, such as [E30⁰N] - wow !! That's Gr. 9 Geography!
- ✘ To determine total displacement in 2 dimensions, displacement vectors can be added together using a scale diagram

COMPASS ROSE



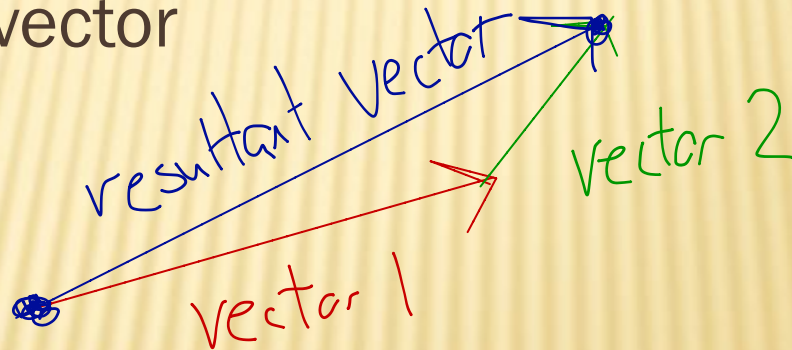
CONVENTION FOR DESCRIBING VECTOR DIRECTIONS



RESULTANT VECTOR

✘ Resultant Vector:

- + A vector that results from adding two or more given vectors
- + Add vectors from the tail of the first vector to the tip of the final vector



ADDING VECTORS A GRAPHICAL APPROACH

- ✗ Choose a suitable scale to represent the vectors (ex. 1cm to 100m)
- ✗ Use a protactor to measure angles

- Copy or Print from website
- Watch 2 or 3 videos on vectors that will be on website.

EXAMPLE #1

- ✘ Brian walks 1.0 m [N] and 2.0 m [E]. Determine the resulting displacement.

EXAMPLE #2

- ✘ A car drives 300.0 km [E] and 400.0 km [NE]. Determine the displacement of the car.

ADDING VECTORS AN ALGEBRAIC APPROACH

- ✘ Perpendicular vectors can be added algebraically using the Pythagorean theorem and the tangent function
- ✘ By using the component method of vector addition, all vector addition problems can be converted into a problem involving two perpendicular vectors

COMPONENT VECTOR

- ✘ The x-vector or the y-vector that can be broken down into an overall vector

ADDING TWO PERPENDICULAR VECTORS USING ALGEBRA

- ✘ A jogger runs 400.0 m [W], turns and continues for an additional 900.0 m [S]. Determine the joggers total displacement.

BREAKING DOWN VECTORS INTO TWO PERPENDICULAR COMPONENTS

- ✘ Break the displacement vector $50.0 \text{ m [E}40^{\circ}\text{N]}$ into 2 perpendicular component vectors.

WORK FOR THE DAY

- ✘ Pg. 65 #1,2,4,5
- ✘ Pg. 67 #1,2
- ✘ Pg. 69 #1,2