Pre-Calculus
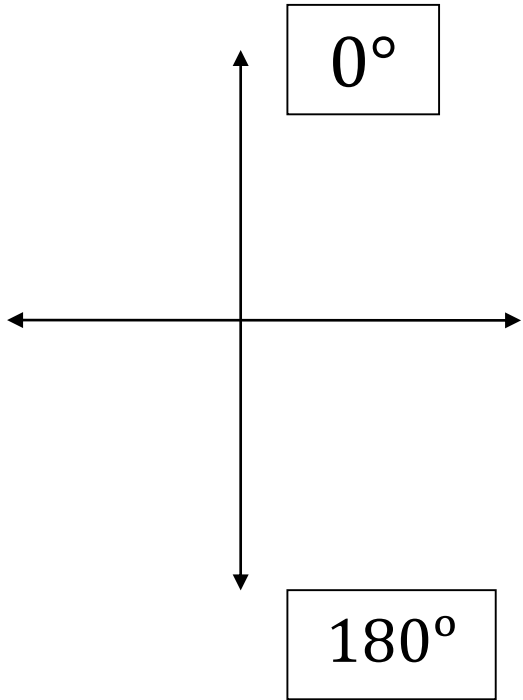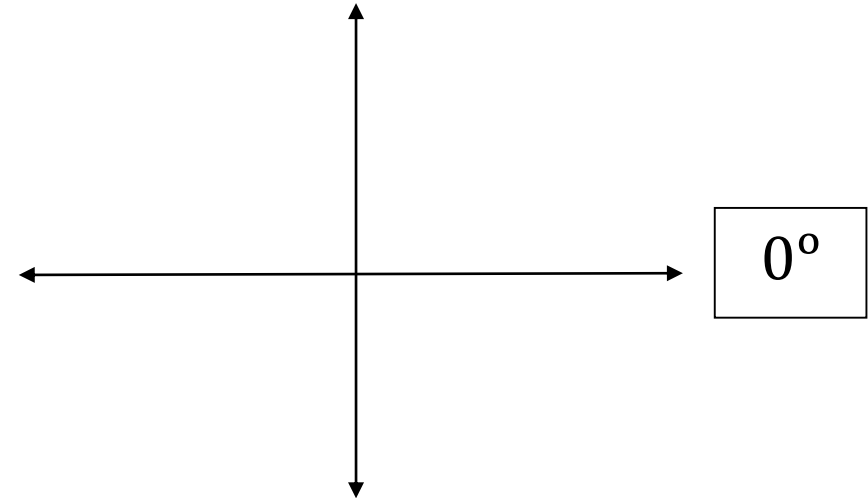# Sec. 6.6 Vectors
Day 2

Compass Direction : clockwise
"Bearing"

Trigonometric Direction :counterclockwise
"Direction Angle/ *True Direction"

DEFINITIONS FOR SPECIFIC ANGLES:

1) Direction Angle- the entire angle counterclockwise from the positive x-axis

2) A **bearing** is an angle, measured clockwise from the north direction.

3) A direction bearing is an angle formed by the terminal side and the closest y-axis

Component Form of a Velocity Vector:

Direction angle

$$v = \langle \|v\| \cos \theta, \|v\| \sin \theta \rangle$$

Speed is the magnitude.

Ex. 1) A jet maintains an airspeed of 550 miles per hour in a southwesterly direction. The velocity of the jet stream is a constant 80 miles per hour *from* the west. Find the actual speed and direction of the aircraft.

Ex. 2) An airplane has an airspeed of 500 kilometers per hour bearing S 40° E. The wind velocity is 60 kilometers in the direction N 30° W. Find the resultant vector representing the path of the plane relative to the ground. What is the ground speed of the plane? What is the direction?

Ex. 3) A ship is 290˚ at 600 knots, it meets a wind at 40 knots from the east. Find the resultant speed and direction.

Ex. 4) Two forces of 45 pounds and 25 pounds act on a body so that the angle between them is 55˚. Assume that the 45 pound force is acting on the positive x-axis. Find the magnitude and direction of the resultant.

Ex. 5) Two tugboats are pulling on a large ship that has gone aground. One tug pulls with a force of 2500 pounds in a compass direction of 55°. The second tug pulls with a force of 2000 pounds in a compass direction of 95°. Find the magnitude and the compass direction of the resultant force.

Ex. 6) A plane is at N30°E with the speed of 520 mph. It's ground speed is 535 mph and its true course is 25°. Find the speed and direction angle, to the nearest tenth, of the wind.