# Chapter 3-2

Component Vectors

# Pythagorean Theorem

 If two vectors are at a 90<sup>0</sup> angle, use the Pythagorean Theorem to find the resultant vector.

• 
$$C^2 = a^2 + b^2$$

Find the angle of the resultant vector by using Tangent function
Tan θ= opp / adj

## Directions

#### There is a difference between Northwest and West of North



A pirate walks 45 m north, then 7.5 m east. What is his displacement?

- Use Pythagorean theorem since it is a 90 degree angle.
- Must find degrees, use tan

Components Every vector can be broken down into 2 components; the x and y components. Use Sine and Cosine Functions to find the x and y components. •  $Sin \theta = opposite / hypotenuse$ •  $\cos \theta = adjacent / hypotenuse$ 

### Practice 3B

• #6. A child rides a toboggan down a hill that descends at an angle of 30.5 degrees to the horizontal. If the hill is 23 m long, what are the horizontal and vertical components?



## Vectors not perpendicular

- Determining the size and direction of the resultant can be achieved by resolving each of the plane's displacement vectors into their x and y components.
- Then the components are added
- Finally use the Pythagorean Theorem to calculate the resultant and tan function to calculate the angle.

## Practice 3C

• #1. A football player runs directly down field for 35m and then turns right at an angle of 25 degrees from his original direction and runs 15m before getting tackled. What is the magnitude and direction of the runner's displacement?





•Unit 3.2 Worksheet