Review of Trig Laws to solve for the resultant vector:

SOHCAHTOA

$$\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}} \qquad \cos\theta = \frac{adjacent}{\text{Hypotenuse}} \qquad \tan\theta = \frac{\text{Opposite}}{adjacent}$$

Sine Law

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

(capital letters are angles, lower case are sides)

Cosine Law

$$z^2 = x^2 + y^2 - 2xy \cdot \cos(Z)$$

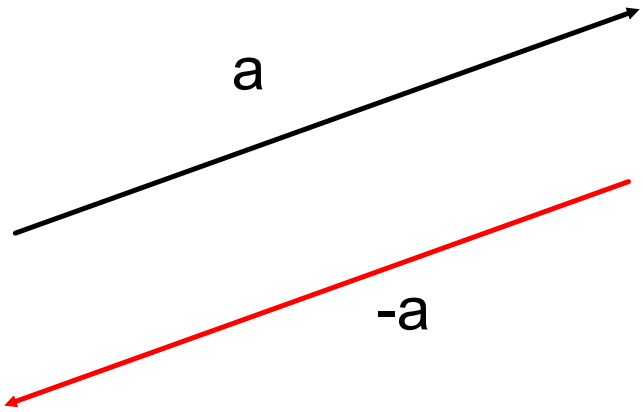
Sep 5 - 1:25 PM

Sec. 1.2a - Acceleration in Two Dimensions

Learning Goal:

- working with vectors in two space
- choosing the correct model

Vectors and Direction



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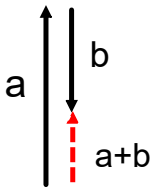
Resultants

(the vector that goes from the "start" to the "finish" in a straight line)

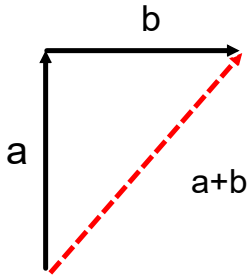


a=8m [N]

b=5m [S]

a+b=

Vector	X	Y
D1		
D2		
Total		

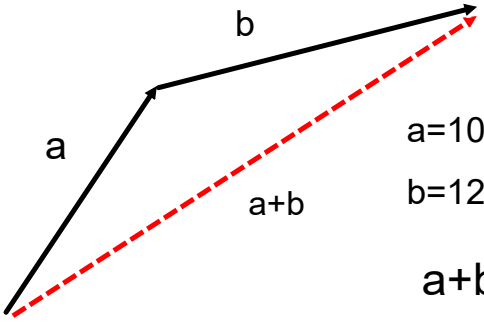


a=4m [N]

b=3m [E]

a+b=

Vector	X	Y
D1		
D2		
Total		



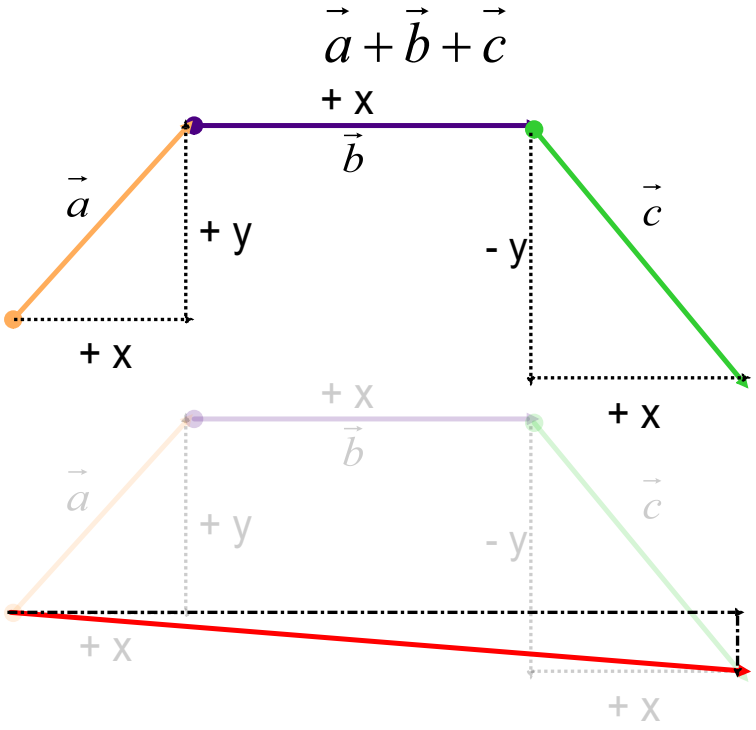
a=10m [N30°E]

b=12m [N70°E]

a+b=

Vector	X	Y
D1		
D2		
Total		

Demo of Adding Three Vectors



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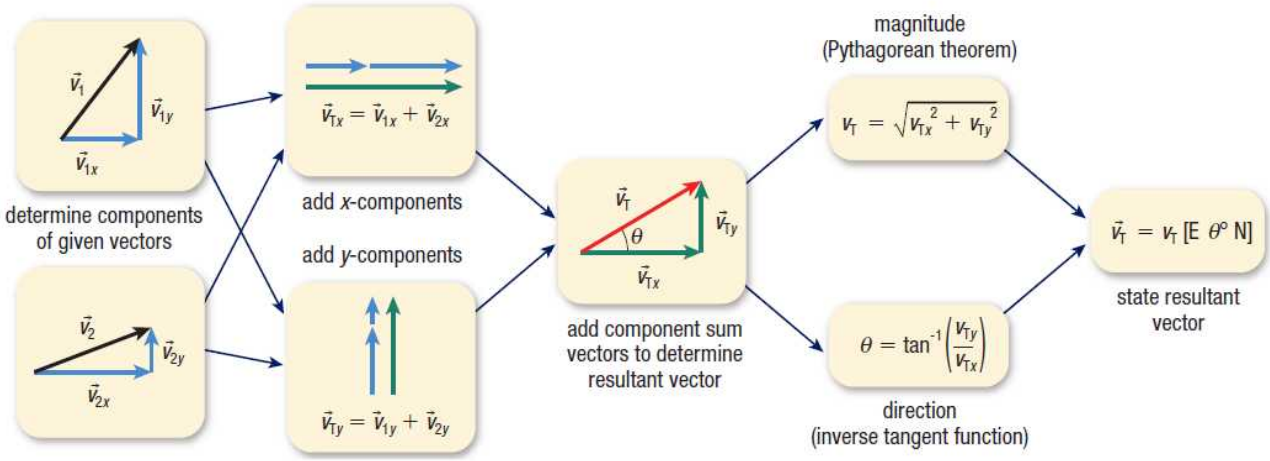
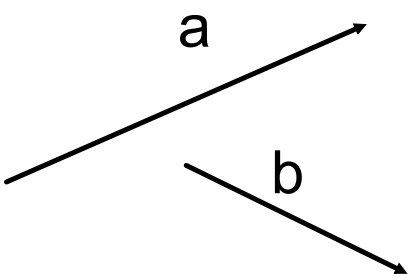
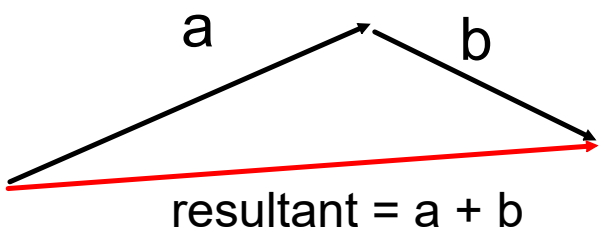


Figure 4 Adding two non-perpendicular vectors algebraically

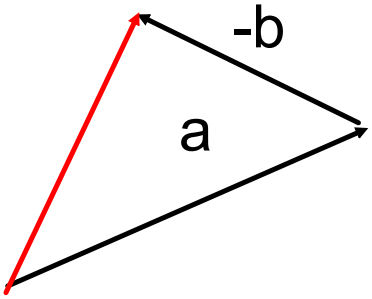
Adding and Subtracting - 2 Dimensions



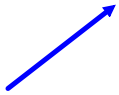
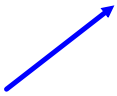


resultant = a - b

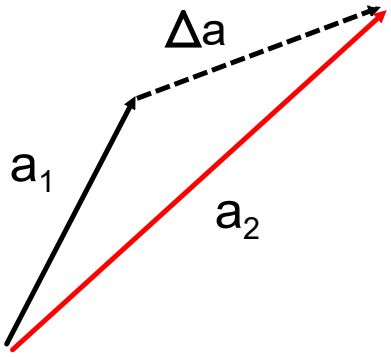
or = a + (-b)



Subtracting Vectors Practice

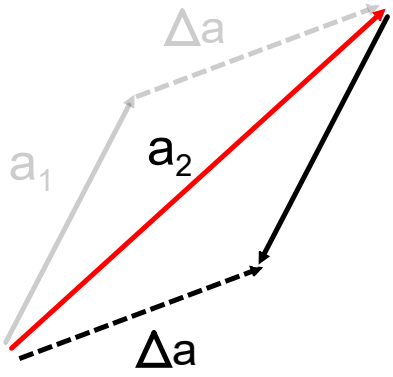
Vectors	Add d_1+d_2	Subtract d_1-d_2
d_1 = 5m [E]		
d_2 = 5m [E]		
d_1 = 5m [E]		
d_2 = 5m [NE] 		
d_1 = 5m [SE] 		
d_2 = 5m [NE] 		

"Differences, Deltas, Change In"



$a_1 + \Delta a = a_2$

$\Delta a = a_2 - a_1$



$\Delta a = a_2 + (-a_1)$

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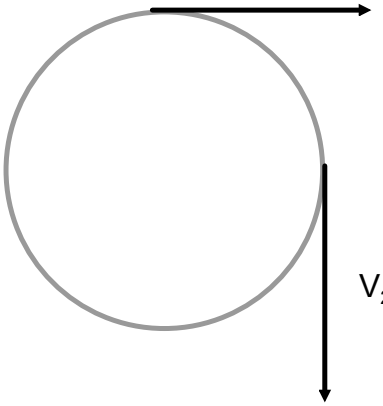
Challenge - Determine the change in Velocity, ΔV

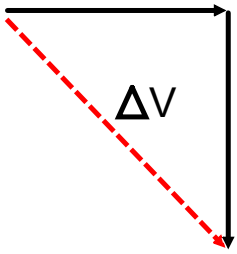
V_1 = 5m/s [E]



V_2 = 8m/s [S]

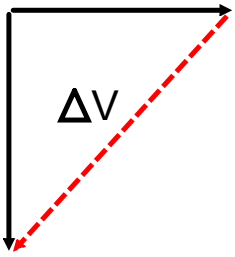
Two options - two different meanings

V_1 = 5m/s [E]



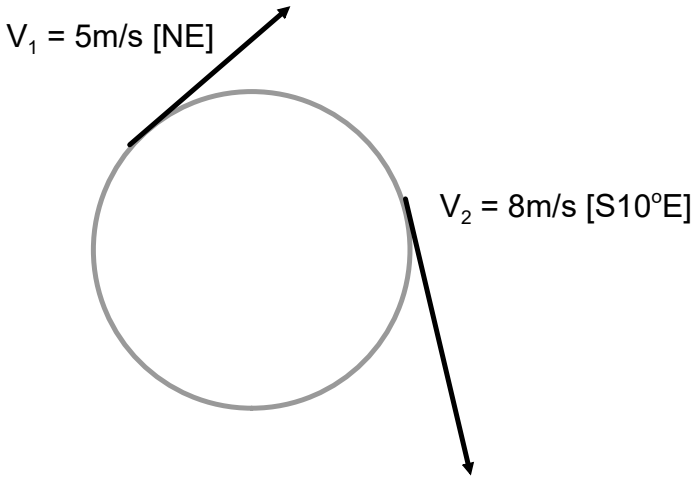
V_2 = 8m/s [S]

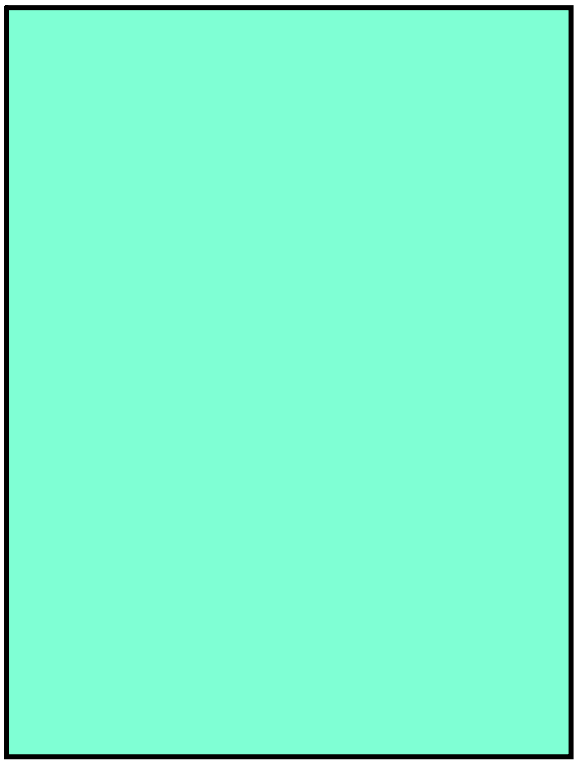
V_1 = 5m/s [E]



V_2 = 8m/s [S]

Challenge - Determine the change in Velocity, ΔV





What is the average acceleration if delta "t" is 0.5 sec?

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Acceleration in Two Dimensions

$$a_{ave} = \frac{\Delta V}{t}$$

X components

$$a_{x\ ave} = \frac{\Delta V_x}{t}$$

Y components

$$a_{y\ ave} = \frac{\Delta V_y}{t}$$

All Vectors (displacement, velocity, acceleration) can also be broken up into their respective components.

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Suggested Homework

Read page 28 - 29

page 29 #25, 28, 29

page 30 - 31 #9, 11, 15

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