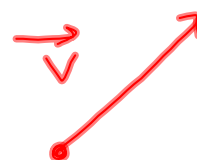


Homework questions?

## 7.5, 7.6 - Vectors

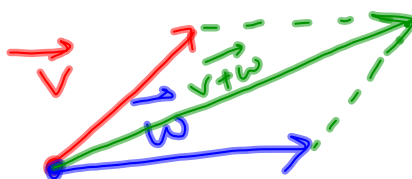
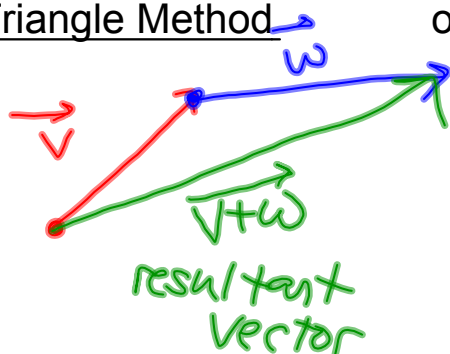
A vector is a directed line segment; it has a unique length (magnitude) and direction angle



Vector Addition:

Vectors can be added using the Triangle Method or the

Parallelogram Method



7.5 #28. An airplane flies  $032^\circ$  for 210 km, and then  $280^\circ$  for 170 km. How far is the plane then, from the starting point, and in what direction?

\*heading measured clockwise from North

SAS  $\Rightarrow$   
Law of Cosines

$$X = \sqrt{170^2 + 210^2 - 2(170)(210)\cos 68^\circ}$$

$\approx 215 \text{ km}$

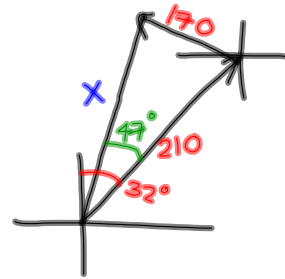
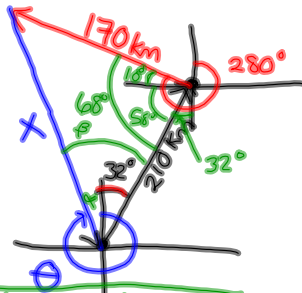
$$\frac{\sin \beta}{170 \text{ km}} = \frac{\sin 68^\circ}{215 \text{ km}}$$

$$\beta = \sin^{-1}\left(\frac{170 \sin 68^\circ}{215}\right)$$

$\approx 47^\circ$

$\alpha = 47^\circ - 32^\circ = 15^\circ$

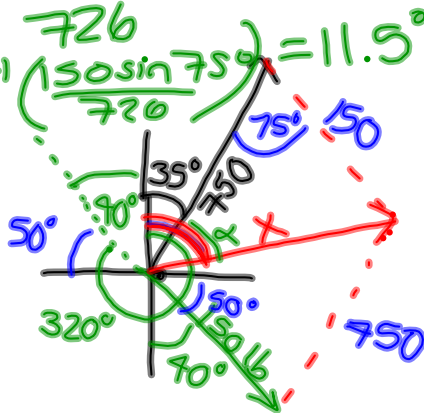
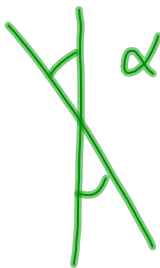
$\theta = 360^\circ - 15^\circ = 345^\circ$



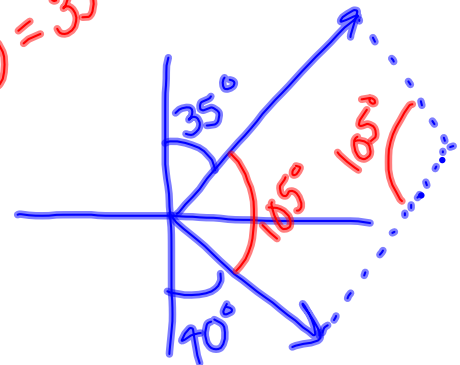
26. 750 lb @  $35^\circ$   
wind 150 lb from  $320^\circ$

$$\frac{\sin \alpha}{150} = \frac{\sin 75^\circ}{726}$$

$$\alpha = \sin^{-1}\left(\frac{150 \sin 75^\circ}{726}\right) = 11.9^\circ$$



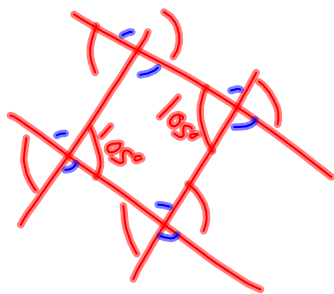
$\theta = 35^\circ + 11.9^\circ = 46.5^\circ$



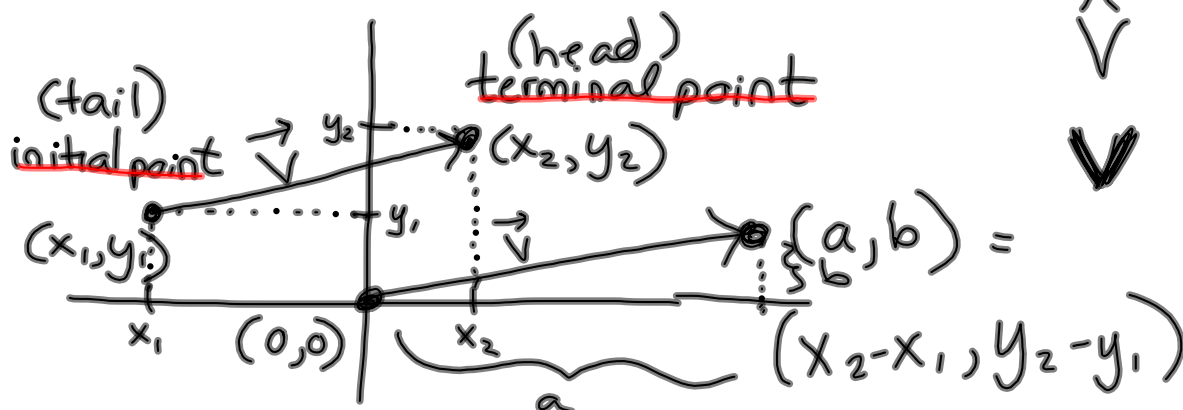
SAS  $\Rightarrow$  Law of Cosines

$$X = \sqrt{150^2 + 750^2 - 2(150)(750)\cos 75^\circ}$$

$\approx 726 \text{ lb}$



# Vectors! (7.5 & 7.6)



$\vec{v} = \langle a, b \rangle =$  "component form" of the vector whose initial point is  $(0,0)$  and terminal point is  $(a, b)$

magnitude of  $\vec{v} = |\vec{v}| = \sqrt{a^2 + b^2}$

point 0-dim'l

line 1-dim'l

square/plane 2-dim

$$\overrightarrow{CD}, C(2,5), D(3,-1)$$

|                      |  
initial pt      terminal pt

find a vector  $\vec{v}$  equivalent to  $\overrightarrow{CD}$  whose initial point is  $(0,0)$ .

terminal point - initial point

$$(3-2, -1-5) = (1, -6)$$

$$\vec{v} = \langle 1, -6 \rangle$$

7.5

# 27, 29

7.6

# 1-7 odd