

PHYS101  
QUIZ#3- CHAPTER 3  
DATE: 27/9/12

Name:

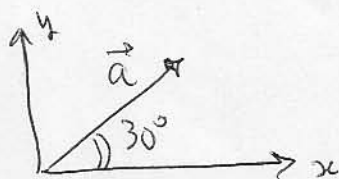
Key

Id#:

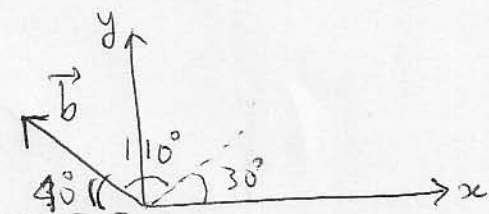
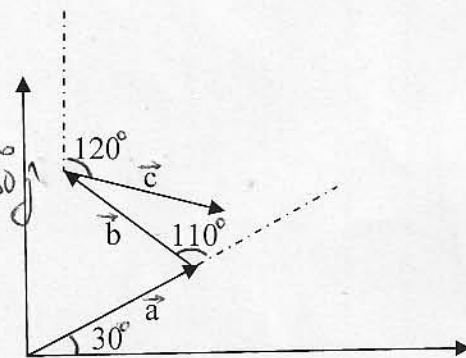
Sect#:

The three vectors  $\vec{a}$ ,  $\vec{b}$ , and  $\vec{c}$  in the figure have equal magnitude of 10 m and angles  $\theta_1 = 30^\circ$ ,  $\theta_2 = 110^\circ$  and  $\theta_3 = 120^\circ$ .

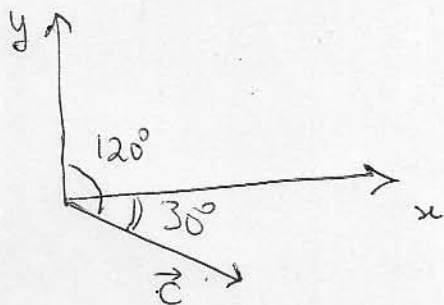
- (a) Find the x and y components of the resultant vector.  
(b) Find the magnitude of the resultant vector.  
(c) Find the direction of the resultant vector.



$$\begin{aligned} \vec{a} &= 10 \cos 30^\circ \hat{i} + 10 \sin 30^\circ \hat{j} \\ &= 8.6 \hat{i} + 5 \hat{j} \end{aligned}$$



$$\begin{aligned} \vec{b} &= -10 \cos 40^\circ \hat{i} + 10 \sin 40^\circ \hat{j} \\ &= -7.6 \hat{i} + 6.42 \hat{j} \end{aligned}$$



$$\begin{aligned} \vec{c} &= 10 \cos 30^\circ \hat{i} - 10 \sin 30^\circ \hat{j} \\ &= 8.6 \hat{i} - 5 \hat{j} \end{aligned}$$

$$\begin{aligned} \vec{d} = \vec{a} + \vec{b} + \vec{c} &= (8.6 - 7.6 + 8.6) \hat{i} + (5 + 6.42 - 5) \hat{j} \\ &= 9.6 \hat{i} + 6.42 \hat{j} \end{aligned}$$

b)  $d = \sqrt{(9.6)^2 + (6.42)^2} = \boxed{11.5 \text{ m}}$

c)  $\theta = \tan^{-1} \left( \frac{6.42}{9.6} \right) = \boxed{33.8^\circ}$  First quadrant!