Phys. 101 - Sec # 6 - Spring (032)

Quiz # 2 (Ch. 3)

Name: Key ID #

1- A vector in the xy plane has a magnitude of 25 m, an x-component of 8.0 m and a negative y-component. What is the **angle** between this vector and the **positive *x*-axis**?

$|A| = 25$ m

$A_x = 8$ m

A_y is –ve $\Rightarrow$ vector A is in the 4th quadrant.

We know that $|A| = \sqrt{A_x^{\,2} + A_y^{\,2}} = 25\ m$

$\Rightarrow A_y = -23.7$ m

now $A = 8\,i - 23.7\,j$

the angle that A makes with +ve x-axis can be found using:

$$\tan\theta = \frac{Ay}{Ax} = \frac{-23}{8}$$

$$\theta = \tan^{-1}\left(\frac{-23}{8}\right) = -71^\circ \text{ or } (360 - 71) = 389^\circ$$

2- Vector **a** = 4 **i** + **j** ,
and vector **b** = -**i** + 3 **j**
Find the angle between **a** and **R** where **R** = **a** + **b**.

$R = 3\,i + 4\,j$

Use the dot product to find the angle between the two vecors a and R:

$a \cdot R = |a|\,|R| \cos\theta$

$12 + 4 = \sqrt{17}\sqrt{25}\cos q$

$$\theta = \cos^{-1}\left(\frac{16}{5\sqrt{17}}\right) = 39^\circ$$