Phys101 – Sec # 26 **Quiz # 2 (Chapter 3)**

Name: Key **ID #** _____

1- The two vectors A and B shown in Fig. 1 have equal magnitudes of 10.0 m. Write the resultant vector, R, of these vectors in unit vector notation, find its magnitude and the angle theta it makes with the positive x-axis.

$A_x = 10\cos 30 = 8.66$

$A_y = 10\sin 30 = 5$

$B_x = 10\cos 120 = -5$

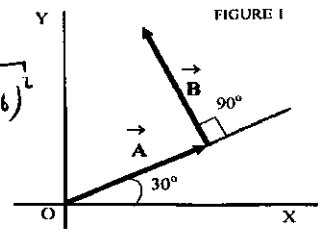
$B_y = 10\sin 120 = 8.66$

$R_x = A_x + B_x = 3.66$

$R_y = A_y + B_y = 13.66$

$\vec{R} = (3.66\hat{i}) + (13.66\hat{j})$

$|R| = \sqrt{(3.66^2) + (13.66)^2} = 14.14$



$\phi = \tan^{-1}\left(\frac{13.66}{3.66}\right) = 75^\circ$

2- Consider two vectors $\vec{\mathbf{A}}$ and $\vec{\mathbf{B}}$ with magnitudes 5 cm and 8 cm, respectively. Vector $\vec{\mathbf{A}}$ is along the positive x-axis and vector $\vec{\mathbf{B}}$ is along the positive y-axis. Find $\vec{\mathbf{A}} \cdot (\vec{\mathbf{A}} + \vec{\mathbf{B}})$.

$\vec{A} = 5\hat{i}$

$\vec{B} = 8\hat{j}$

$\vec{A} + \vec{B} = 5\hat{i} + 8\hat{j}$

$\vec{A} \cdot (\vec{A} + \vec{B}) = (5\hat{i}) \cdot (5\hat{i} + 8\hat{j})$

$= \boxed{25}$

3- Three vectors $\vec{F}$, $\vec{v}$ and $\vec{B}$ are related through $\vec{F} = 5.0(\vec{v} \times \vec{B})$. If vector $\vec{v} = 3.0\,\hat{i} - 5.0\hat{j}$ and $\vec{B} = -2.0\,\hat{k}$

Write the vector $\vec{F}$ in unit vector notation.

$\vec{v} \times \vec{B} = (6\hat{j} + 10\hat{i})$

$\vec{F} = 5(\vec{v} \times \vec{B}) = (30\hat{j} + 50\hat{i})$