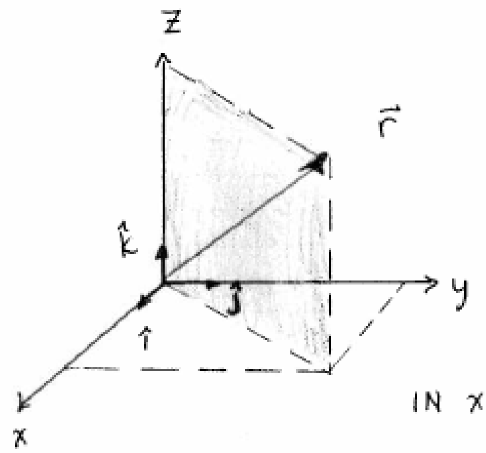
NOTES: 3-D vectors

VECTORS.. IN... SPACE



IN COMPONENT FORM

$\vec{r} =$

MAGNITUDE?

IN x-y PLANE

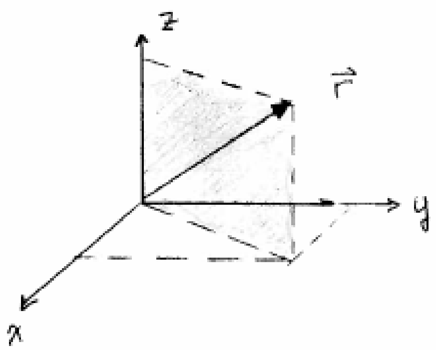
$B =$

IN SHADED PLANE

$r =$

HENCE

DIRECTION?



$\frac{r_x}{r} =$

$\frac{r_y}{r} =$

$\frac{r_z}{r} =$

$\vec{r} = \quad \hat{i} + \quad \hat{j} + \quad \hat{k}$

$= r\left[\quad \hat{i} + \quad \hat{j} + \quad \hat{k} \right]$

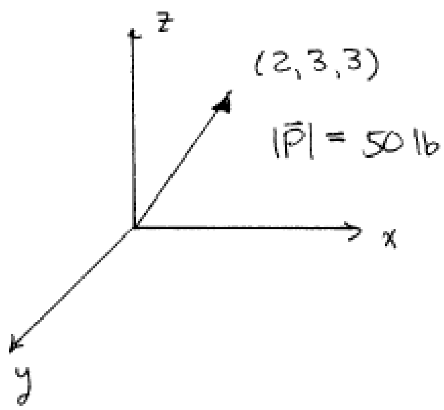
NOTES: 3-D vectors

$$\cos^2\theta_x + \cos^2\theta_y + \cos^2\theta_z \stackrel{?}{=}$$

IN DIRECTION of $\vec{F}$

$$\hat{e}_{\vec{F}} =$$

DEFINING A DIRECTION IN 3-D SPACE



1) FIND COOR. of HEAD

2) FIND COOR. of TAIL.

3) SUBTRACT ______ FROM ______ . (POSITION VECTOR)

$$\vec{r} = \qquad \hat{i} + \qquad \hat{j} + \qquad \hat{k}$$

4) FIND ______ ______ IN DIRECTION of $\vec{P}$

$$\hat{e}_{\vec{P}} = \underline{\qquad\qquad} =$$

$$=$$

$$\vec{P} = P\hat{e}_p = \qquad \hat{e}_p = \qquad \hat{i} + \qquad \hat{j} + \qquad \hat{k}$$

NOTES: 3-D vectors

DOT PRODUCT (AKA SCALAR PRDT)

$$\boxed{\vec{A} \cdot \vec{B} = \qquad\qquad}$$

$\vec{A} \cdot \vec{B} =$

$$\vec{A} \cdot \vec{B} = (A_x \hat{\imath} + A_y \hat{\jmath} + A_z \hat{k}) \cdot (B_x \hat{\imath} + B_y \hat{\jmath} + B_z \hat{k})$$

$$= A_x B_x \hat{\imath} \cdot \hat{\imath} + A_x B_y \hat{\imath} \cdot \hat{\jmath} + \dots$$

$$+ \dots + A_y B_y \hat{\jmath} \cdot \hat{\jmath} + A_y B_z \hat{\jmath} \cdot \hat{k}$$

$$+ \dots + \dots + A_z B_z \hat{k} \cdot \hat{k}$$

$\hat{\imath} \cdot \hat{\imath} = ?$

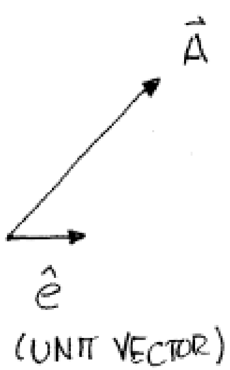
$\hat{\imath} \cdot \hat{\jmath} = ?$ $\qquad \hat{\jmath} \cdot \hat{\jmath} = ?$

$\hat{\imath} \cdot \hat{k} = ?$

SO:

$$\boxed{\vec{A} \cdot \vec{B} = \qquad\qquad}$$

INTERPRETATION & ULTILITY:



$\vec{A} \cdot \hat{e} =$