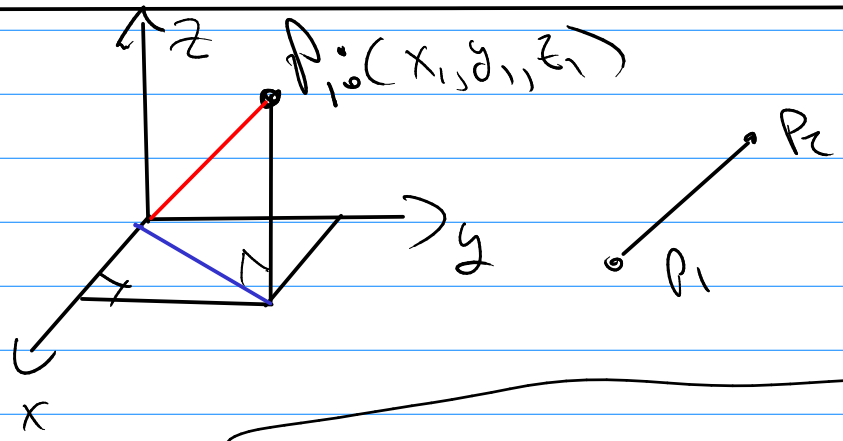
Math 344

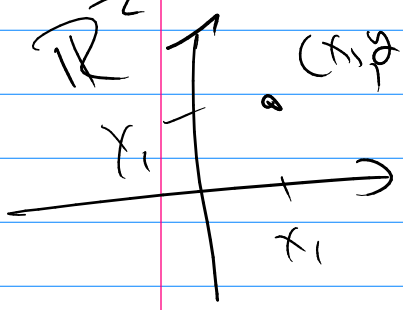
Homework -- Key: wichita 6562 7232

Ch 10

$\mathbb{R}^3$



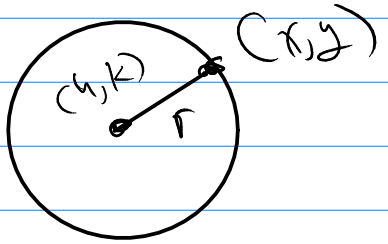
$\mathbb{R}^2$



$$|P_1P_2| = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2}$$

$$|P_1P_2| = \sqrt{(\Delta x)^2 + (\Delta y)^2 + (\Delta z)^2}$$

$\mathbb{R}^2$

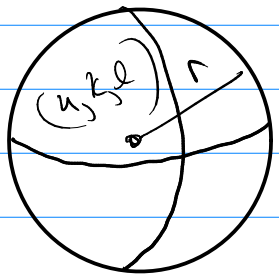


$$r = \sqrt{(x-h)^2 + (y-k)^2}$$

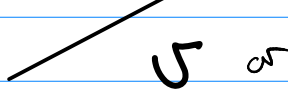
$$r^2 = (x-h)^2 + (y-k)^2$$

$\mathbb{R}^3$

$$r^2 = (x-h)^2 + (y-k)^2 + (z-\ell)^2$$

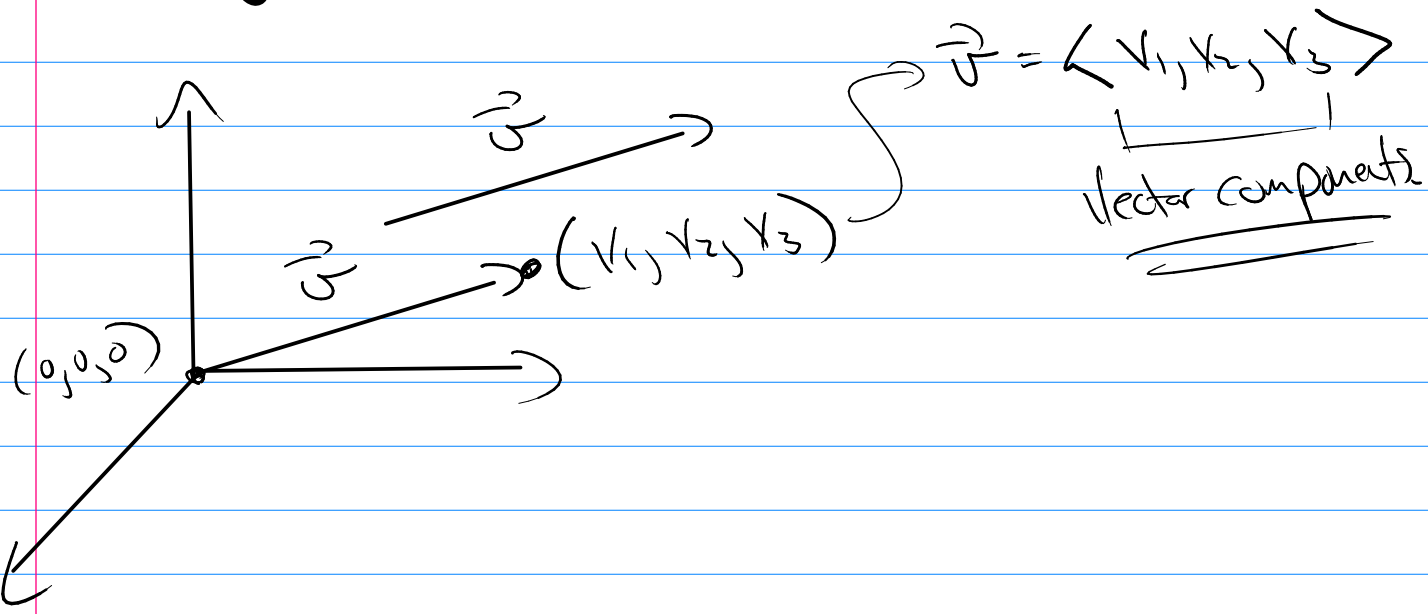


Vectors



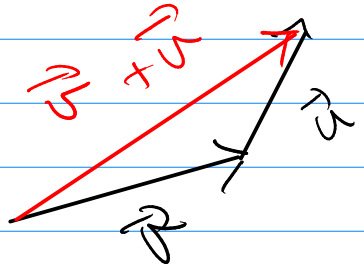
$\vec{v}$ or $\vec{v}$

object with direction and magnitude.

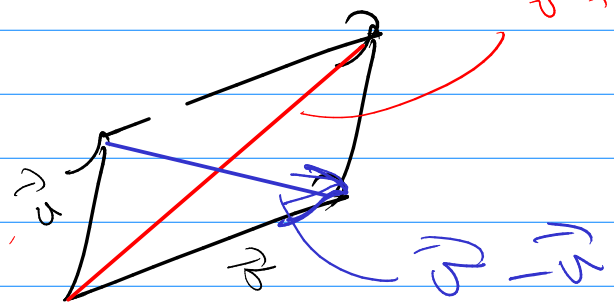


Operations:

$\vec{v} + \vec{u}$



$\vec{v} - \vec{u}$



(15) $v = \langle v_1, v_2, v_3 \rangle$ $a = \langle a_1, a_2, a_3 \rangle$

$v \pm a = \langle v_1 \pm a_1, v_2 \pm a_2, \ldots \rangle$

$\overrightarrow{P_1P_2} = \langle x_2 - x_1, y_2 - y_1, z_2 - z_1 \rangle$

$|\overrightarrow{P_1P_2}| = \sqrt{(x_2 - x_1)^2 + \text{etc}}$

Properties: $\vec{a} + \vec{b} = \vec{b} + \vec{a}$

p. 546 $(\vec{a} + \vec{b}) + \vec{c} = \vec{a} + (\vec{b} + \vec{c})$

(plus more) $\vec{a} + \vec{0} = \vec{a}$

$(\vec{a} + -\vec{a}) = \vec{0}$

Notation: $\vec{i} = \langle 1, 0, 0 \rangle$ $\vec{j} = \langle 0, 1, 0 \rangle$ $\vec{k} = \langle 0, 0, 1 \rangle$

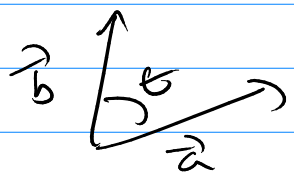
$\vec{v} = \langle v_1, v_2, v_3 \rangle$

$\vec{v} = v_1\vec{i} + v_2\vec{j} + v_3\vec{k}$

"Multiplication like"?

Dot Product: $\vec{a} \cdot \vec{b} = a_1b_1 + a_2b_2 + a_3b_3$

$= |a||b|\cos(\theta)$

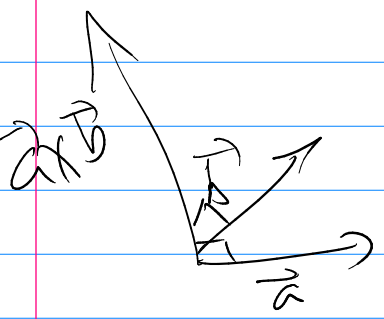


Work = Force $\cdot$ Displacement

Cross Product ($\mathbb{R}^3$ or above)

$$\vec{a} \times \vec{b} = \begin{vmatrix} i & j & k \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & a_3 \end{vmatrix}$$

$= \langle a_2b_3 - a_3b_2, a_3b_1 - a_1b_3, a_1b_2 - a_2b_1 \rangle$



$|\vec{a} \times \vec{b}| = |a||b|\sin\theta$