p.417 #3 $P_1(1,2,4)$ and $P_2(-2,1,4)$ and $P_3(-5,0,4)$ are colinear

$$\overrightarrow{P_1P_2} = \overrightarrow{OP_2} - \overrightarrow{OP_1} = \begin{pmatrix} -2 \\ 1 \\ 4 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \\ 4 \end{pmatrix} = \begin{pmatrix} -3 \\ -1 \\ 0 \end{pmatrix}$$

$$\overrightarrow{P_1P_3} = \overrightarrow{OP_3} - \overrightarrow{OP_1} = \begin{pmatrix} -5 \\ 0 \\ 4 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \\ 4 \end{pmatrix} = \begin{pmatrix} -6 \\ -2 \\ 0 \end{pmatrix} \quad \times 2$$

$\overline{P_1P_4}$ is colinear since $\overline{P_1P_2} = \frac{1}{2}\overline{P_1P_3}$ or $\overline{P_1P_3} = 2\overline{P_1P_2}$ then they are colinear

$\overline{P_1P_4} = K\overline{P_1P_2}$, for some $K \in \mathbb{R}$

$$\overrightarrow{P_1P_4} = \begin{pmatrix} 2 \\ y \\ 2 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \\ 4 \end{pmatrix} = \begin{pmatrix} 1 \\ y-2 \\ 2-4 \end{pmatrix}$$

$\overrightarrow{OP_4} - \overrightarrow{OP_1}$

now $\begin{pmatrix} 1 \\ y-2 \\ 2-4 \end{pmatrix} = K\begin{pmatrix} -3 \\ -1 \\ 0 \end{pmatrix}$

x-comp. $1 = -3K \Rightarrow K = -\frac{1}{3}$

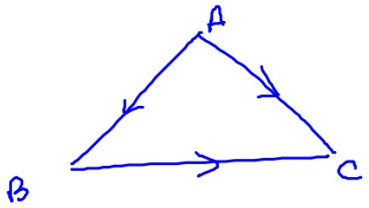
$y-2 = -\frac{1}{3}(-1) = 7/3$

6. $\overrightarrow{AB} = \begin{pmatrix} 1 \\ y \\ -2 \end{pmatrix}$, $\overrightarrow{BC} = \begin{pmatrix} 2x \\ -3 \\ 2 \end{pmatrix}$ and $\overrightarrow{AC} = \begin{pmatrix} 1 \\ 4 \\ x+y \end{pmatrix}$

$x =$
$y =$
$z =$

$\overrightarrow{AB} + \overrightarrow{BC} - \overrightarrow{AC} = 0$

$\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC}$



$$\begin{pmatrix} 1 \\ y \\ -2 \end{pmatrix} + \begin{pmatrix} 2x \\ -3 \\ 2 \end{pmatrix} - \begin{pmatrix} 1 \\ 4 \\ x+y \end{pmatrix} = 0$$

$1 + 2x - 1 = 0$

$2x = 0$

$x = 0$

$1 + 2x = 1$

$2x = 0$

$x = 0$

$y - 3 - 4 = 0$

$y = 7$

$-2 + 2 - (0 + 7) = 0$

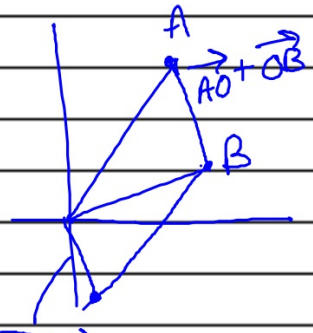
$-2 + 2 - 7 = 0$

$z = 9$

Cornell Notes	Topic/Objective: Distance between points in space - and unit vectors	Name:
AVID Decades of College Dreams		Class/Period: 3
		Date: 9/11/17

Essential Question: How do we find distance using vectors?
How do we describe vectors using the unit vector?

Questions:



$\overrightarrow{OB}-\overrightarrow{OA}$

Notes: DISTANCE BETWEEN TWO POINTS IN SPACE?

TO FIND THE DISTANCE BETWEEN

$A=(x_1,y_1,z_1)$ and $B=(x_2,y_2,z_2)$

$\overrightarrow{AB}=\overrightarrow{AO}+\overrightarrow{OB}=\overrightarrow{OB}-\overrightarrow{OA}=b-a$

$=(x_2-x_1)i+(y_2-y_1)j+(z_2-z_1)K$

and the Distance

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

Ex. Find the vector AB from A(-1,5,1) and B(4,5,-1) and hence determine the distance between A and B

$\overrightarrow{AB}=(4-{}^-1)i+(5-5)j+(-1-1)K=5i-2K=\begin{pmatrix}5\\0\\-2\end{pmatrix}$

$|\overrightarrow{AB}|=\sqrt{(5)^2+(0)^2+(-2)^2}=\sqrt{29}$

Questions:	Notes:
	Ex) Given that $a = x\mathbf{i} + 6\mathbf{j} - 2\mathbf{k}$ and $\lvert a\rvert = 3x$ find the two possible values of x
	$\begin{pmatrix} x \\ 6 \\ -2 \end{pmatrix}$ $\lvert a\rvert = \sqrt{(x)^2 + (6)^2 + (-2)^2}$
HW 12E p.418	$(3x)^2 = \left(\sqrt{(x)^2 + (6)^2 + (-2)^2}\right)^2$
	$9x^2 = x^2 + 36 + 4$
#2, 3, 5	$9x^2 = x^2 + 40$
	$9x^2 - x^2 - 40 = 0$
	$8x^2 - 40 = 0$
	$8(x^2 - 5) = 0$ $\quad$ $\frac{8x^2}{8} = \frac{40}{8}$
	$8 \neq 0$ $\quad x^2 - 5 = 0$ $\quad x^2 = 5$ $\quad x^2 = 5$
	$x = \pm\sqrt{5}$ $\quad x = \pm\sqrt{5}$