ASSIGNMENT TEST 3 SOLUTIONS

1. $\frac{x+2}{1} = \frac{y-2}{3} = \frac{z+3}{4}$.

a) $\underline{r} = \begin{pmatrix} -2 \\ 2 \\ -3 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 3 \\ 4 \end{pmatrix}$

b) either sub in Cartesian or $\lambda = 2$.

2. a) $\underline{r} = \vec{OA} + \lambda \vec{AB} + \mu \vec{AC}$

$$\underline{r} = \begin{pmatrix} 2 \\ -1 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ 4 \\ -3 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ 3 \\ 3 \end{pmatrix}$$

b) To find vector $\underline{n}$ perpendicular to the plane

$$\underline{n} = \begin{vmatrix} i & j & k \\ -1 & 4 & -3 \\ 2 & 3 & 3 \end{vmatrix}$$

$$= \underline{i}(12+9) - \underline{j}(-3+6) + \underline{k}(-3-8)$$

$$= 21\underline{i} - 3\underline{j} - 11\underline{k}$$

$$\underline{r} \cdot \underline{n} = \underline{a} \cdot \underline{n}$$

$$\underline{r} \cdot \begin{pmatrix} 21 \\ -3 \\ -11 \end{pmatrix} = 21 \times 2 - 3 \times -1 - 11 \times 2$$

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$$\underline{r} \cdot \begin{pmatrix} 21 \\ -3 \\ -11 \end{pmatrix} = 23$$

$$21x - 3y - 11z - 23 = 0$$

3. $3x + 2y - 4z = 18$

Find 3 points on the plane

$\vec{OA}$	$\vec{OB}$	$\vec{OC}$
x	y	z
6	0	0
0	9	0
0	0	$-\frac{9}{2}$

any 3 points you choose.

then $\underline{r} = \begin{pmatrix} 6 \\ 0 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} -6 \\ 9 \\ 0 \end{pmatrix} + \mu \begin{pmatrix} -6 \\ 0 \\ -\frac{9}{2} \end{pmatrix}$

$\begin{pmatrix} x \\ -\frac{2}{3} \end{pmatrix}$

or simplified

$$r = \begin{pmatrix} 6 \\ 0 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -3 \\ 0 \end{pmatrix} + \mu \begin{pmatrix} 4 \\ 0 \\ 3 \end{pmatrix}$$