ASSIGNMENT TEST 2 SOLUTIONS

1. a) $11 + 4\lambda = 24 + 7\mu$ — ①
$5 + 2\lambda = 4 + \mu$ — ② $\times 2$.

$11 + 4\lambda = 24 + 7\mu$.
$10 + 4\lambda = 8 + 2\mu$
$1 = 16 + 5\mu$. subtract.
$-3 = \mu$

sub back in ②.
$5 + 2\lambda = 4 - 3$
$2\lambda = -4$
$\lambda = -2$.

equate k's $6 + 4\lambda = 13 + 5\mu$.
$6 + 4(-2) = 13 + 5(-3)$
$-2 = -2$
so they intersect

b) sub $\lambda = -2$ back
$\underline{r} = 11\underline{i} + 5\underline{j} + 6\underline{k} - 2(4\underline{i} + 2\underline{j} + 4\underline{k})$
$= 3\underline{i} + \underline{j} - 2\underline{k}$

Pt of intersection $(3, 1, -2)$

c) $\cos\theta = \dfrac{\underline{a}\cdot\underline{b}}{|\underline{a}||\underline{b}|}$
$= \dfrac{28 + 2 + 20}{\sqrt{(4^2+2^2+4^2)}\sqrt{(7^2+1^2+5^2)}}$
$= \dfrac{50}{6 \times 5\sqrt{3}}$
$= \dfrac{50\sqrt{3}}{30 \times 3}$
$= \dfrac{5}{9}\sqrt{3}$

$\underline{a} = \begin{pmatrix} 4 \\ 2 \\ 4 \end{pmatrix}$ or $\begin{pmatrix} 2 \\ 1 \\ 2 \end{pmatrix}$

$\underline{b} = \begin{pmatrix} 7 \\ 1 \\ 5 \end{pmatrix}$

ASSIGNMENT TEST 2 SOLUTIONS CONTINUED

2. a) $\underline{r} = \begin{pmatrix} 1 \\ 2 \\ 7 \end{pmatrix} + \lambda \begin{pmatrix} 4 \\ 0 \\ -1 \end{pmatrix}$

b) $\underline{r} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ 2 \\ 5 \end{pmatrix}$

c) Common denominator 18

~~d)~~ $\frac{3x}{18} = \frac{6y}{18} + \frac{19}{18}$

$\frac{x-0}{6} = \frac{y + \frac{19}{6}}{3}$

$\underline{r} = \begin{pmatrix} 0 \\ -\frac{19}{6} \end{pmatrix} + \lambda \begin{pmatrix} 6 \\ 3 \end{pmatrix}$ OR $\begin{pmatrix} 0 \\ -\frac{19}{6} \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

d) $\underline{r} = \begin{pmatrix} 4 \\ 7 \\ -1 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 8 \\ 5 \end{pmatrix}$

e) $\underline{r} = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix} + \lambda \begin{pmatrix} -6 \\ -6 \\ 5 \end{pmatrix}$

OR $\underline{r} = \begin{pmatrix} -7 \\ -4 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 6 \\ 6 \\ -5 \end{pmatrix}$