VECTOR EQUATION OF LINES

1. Find p and q given that

   a) $(7, 0, 2)$ lies on $\mathbf{r} = \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ p \\ 1 \end{pmatrix}$ p=

   b) $(5, q, 1)$ lies on $\mathbf{r} = \begin{pmatrix} 1 \\ 2 \\ p \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ 1 \\ p^2 \end{pmatrix}$ p=   q=

   c) $(p, 2p, 5)$ lies on $\mathbf{r} = \begin{pmatrix} 1 \\ 5 \\ 4 \end{pmatrix} + \lambda \begin{pmatrix} q \\ -q \\ 1 \end{pmatrix}$ p=   q=

2. Join up the lines with their point of intersection:

   a) $\mathbf{r} = \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 0 \\ 2 \end{pmatrix}$ & $\mathbf{r} = \begin{pmatrix} 6 \\ 1 \\ 3 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$ $(1, -2, 1)$

   b) $\mathbf{r} = \begin{pmatrix} 2 \\ -1 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ 3 \\ 1 \end{pmatrix}$ & $\mathbf{r} = \begin{pmatrix} 1 \\ -2 \\ 5 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ -1 \\ -3 \end{pmatrix}$ $(3, -4, -1)$

   c) $\mathbf{r} = \begin{pmatrix} 4 \\ 1 \\ -5 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ -1 \\ 2 \end{pmatrix}$ & $\mathbf{r} = \begin{pmatrix} 3 \\ -5 \\ 0 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ -3 \\ -1 \end{pmatrix}$ $(7, 2, 4)$

3. Drag and drop the correct value of p and the point of intersection to the correct pair of lines (given that the following pairs of lines intersect):

   a) $\mathbf{r} = \begin{pmatrix} 4 \\ p \\ -3 \end{pmatrix} + \lambda \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} 2 \\ -2 \\ 4 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ 3 \\ -1 \end{pmatrix}$

   b) $\mathbf{r} = \begin{pmatrix} p \\ 2p \\ 6 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ 1 \\ -1 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} 8 \\ 6 \\ 4 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix}$

p= -2	P=-1	P=1	P=2	P=3	P=4
(4,0,3)	(7,1,4)	(7,8,4)	(4,1,3)	(4,2,-1)	(4,7,1)