Higher Mathematics
Vectors Homework
Expressions & Functions 1.4

1 A is the point (-3, 2, 4) and B is (-1, 3, 2). Find

(a) the components of vector $\overrightarrow{AB}$ ***1***

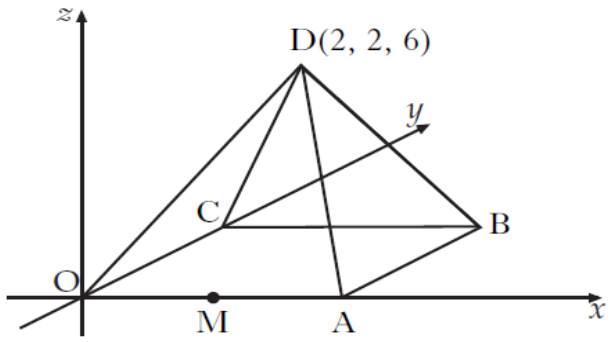
(b) the length of $\overrightarrow{AB}$ ***2***

2 Show that P(2, 2, 3), Q(4, 4, 1) and R(5, 5, 0) are collinear and find the ratio in which Q divides PR. ***4***

3 Show that the vectors $\boldsymbol{a} = 2\boldsymbol{i} + 3\boldsymbol{j} - \boldsymbol{k}$ and $\boldsymbol{b} = 3\boldsymbol{i} - \boldsymbol{j} + 3\boldsymbol{k}$ are perpendicular. ***3***

4 The point Q divides the line joining P(−1,−1, 0) to R(5, 2,−3) in the ratio 2 : 1.
Find the coordinates of Q. ***3***

5 D,OABC is a square based pyramid as shown in the diagram below.



O is the origin, D is the point $(2, 2, 6)$ and OA = 4 units.

M is the mid-point of OA.

(*a*) State the coordinates of B. ***1***

(*b*) Express $\overrightarrow{DB}$ and $\overrightarrow{DM}$ in component form. ***3***

(*c*) Find the size of angle BDM. ***5***