



Show all working – <u>No</u> calculator allowed.



- The diagrams below shows the four vectors <u>a</u>, <u>b</u> and <u>c</u>.
 On squared paper draw the resultant vectors for:
 - a) $\underline{a} + \underline{c}$ (b) $2\underline{a} + \underline{b}$
 - c) $3\underline{a} + \underline{c}$ (d) $2\underline{b} + 2\underline{c}$





b) State the coordinates of all the vertices of this cuboid:



3. Find the resultant force for each of the vector sets below:

a)
$$u = \begin{pmatrix} 2\\1\\2 \end{pmatrix}, v = \begin{pmatrix} 8\\0\\-3 \end{pmatrix} and w = \begin{pmatrix} -5\\5\\6 \end{pmatrix}$$
 (b) $p = \begin{pmatrix} -5\\7\\-2 \end{pmatrix}, q = \begin{pmatrix} -5\\-1\\-9 \end{pmatrix} and r = \begin{pmatrix} 7\\-1\\3 \end{pmatrix}$
c) $a = \begin{pmatrix} -6\\2\\-8 \end{pmatrix}, b = \begin{pmatrix} 10\\-4\\8 \end{pmatrix} and c = \begin{pmatrix} -3\\2\\3 \end{pmatrix}$

4. State the components of each of the 3 vectors, \underline{a} , \underline{b} & \underline{c} in the diagram of Question 1 above.





- 5. Using the components from Question 4 above calculate:
 - **a**) $|\underline{a} + \underline{b}|$ (**b**) $|2\underline{a} + 3\underline{b}|$
 - c) $|3\underline{b} + \underline{c}|$ (d) $|\underline{a} + 4\underline{c}|$

