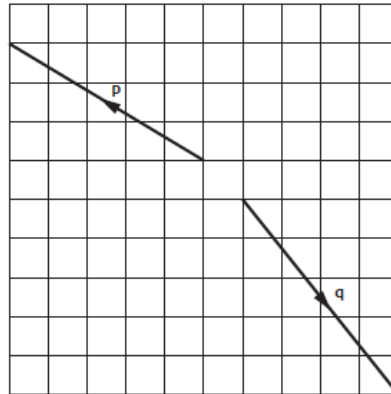


Calculators should be used and all answers rounded to 1 dp

Unit level:

1. The diagram shows 2 directed line segments p and q .

Draw the resultant of $2p + q$



2. Vector $p = \begin{pmatrix} 1 \\ 6 \end{pmatrix}$ and vector $q = \begin{pmatrix} 2 \\ -6 \end{pmatrix}$. Calculate $|3p + q|$

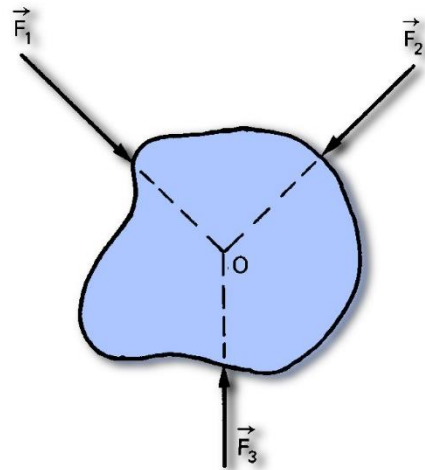
3. The forces acting on a body are represented by three vectors F_1, F_2 and F_3 are given opposite.

Find the resultant force ($F_1 + F_2 + F_3$).

$$F_1 = \begin{pmatrix} 4 \\ 1 \\ 1.5 \end{pmatrix}$$

$$F_2 = \begin{pmatrix} -2 \\ 8 \\ 6.5 \end{pmatrix}$$

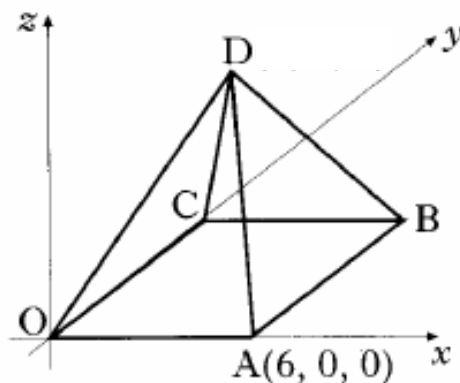
$$F_3 = \begin{pmatrix} 3.5 \\ 9 \\ -1 \end{pmatrix}$$



4. The diagram shows a square-based pyramid of height 8 units.

Square $OABC$ has a side length of 6 units.

What are the coordinates of B and D ?

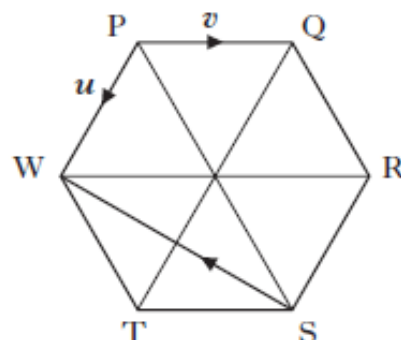


Assessment level:

5. The diagram shows a regular hexagon $PQRSTW$.

\overrightarrow{PW} and \overrightarrow{PQ} represent vectors u and v respectively.

What is \overrightarrow{SW} in terms of u and v ?

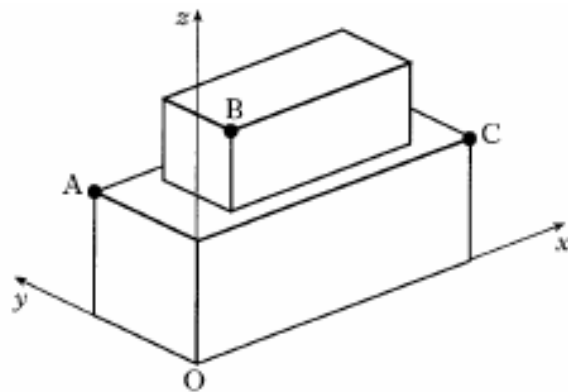
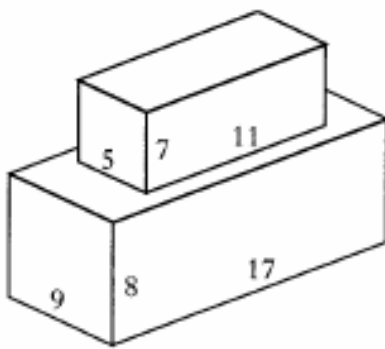


PTO

6. Given that $\mathbf{p} = \begin{pmatrix} 2 \\ 5 \\ -7 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} -4 \\ 2 \\ 0 \end{pmatrix}$, express $2\mathbf{p} - \mathbf{q} - \frac{1}{2}\mathbf{r}$ in component form

7. Given that $\mathbf{u} = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} -1 \\ 2 \\ 4 \end{pmatrix}$, find $|3\mathbf{u} - 2\mathbf{v}|$

8. A cuboid measuring 11cm by 5cm by 7cm is placed **centrally** on top of another cuboid measuring 17cm by 9cm by 8cm. Coordinate axes are taken as shown.



The point A has coordinates $(0, 9, 8)$. Write down the coordinates of B and C

9. If $\mathbf{u} = k \begin{pmatrix} 2 \\ 3 \\ 6 \end{pmatrix}$, where $k > 0$ and $|\mathbf{u}| = 28$, determine the value of k .