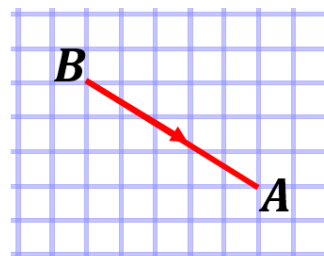


Question 1

Write the column vector $\overrightarrow{BA}$.



Ade's answer: $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$



Belle's answer: $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$



Chloe's answer: $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$



Dean's answer: $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$

Question 2

$$\underline{\mathbf{a}} = \begin{pmatrix} 3 \\ -5 \end{pmatrix} \text{ and } \underline{\mathbf{b}} = \begin{pmatrix} -6 \\ 10 \end{pmatrix}$$

Fill in the blank in the sentence below:

Vector **a** is _____ times the length of vector **b**.



Ade's answer: 2



Belle's answer: -2



Chloe's answer: $\frac{1}{2}$



Dean's answer: $-\frac{1}{2}$

Question 3

$$\underline{\mathbf{p}} = \begin{pmatrix} 5 \\ 3 \end{pmatrix} \text{ and } \underline{\mathbf{q}} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$$

Find the resultant vector $\underline{\mathbf{p}} + 2\underline{\mathbf{q}}$, giving your answer as a column vector.



Ade's answer: $\begin{pmatrix} 3 \\ 7 \end{pmatrix}$



Belle's answer: $\begin{pmatrix} 1 \\ 11 \end{pmatrix}$



Chloe's answer: $\begin{pmatrix} 9 \\ 11 \end{pmatrix}$



Dean's answer: $8\underline{\mathbf{p}} + 4\underline{\mathbf{q}}$

Question 4

$$\underline{\mathbf{a}} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}, \underline{\mathbf{b}} = \begin{pmatrix} -5 \\ 3 \end{pmatrix} \text{ and } \underline{\mathbf{c}} = \begin{pmatrix} -3 \\ -1 \end{pmatrix}$$

Find the resultant vector $3\underline{\mathbf{a}} - \underline{\mathbf{b}} + 2\underline{\mathbf{c}}$, giving your answer as a column vector.



Ade's answer: $\begin{pmatrix} -7 \\ -2 \end{pmatrix}$



Belle's answer: $\begin{pmatrix} -17 \\ -2 \end{pmatrix}$



Chloe's answer: $\begin{pmatrix} 0 \\ 3 \end{pmatrix}$



Dean's answer: $\begin{pmatrix} -17 \\ 4 \end{pmatrix}$

Question 5

$$3 \begin{pmatrix} p \\ q \end{pmatrix} - 2 \begin{pmatrix} q \\ 2p \end{pmatrix} = \begin{pmatrix} 12 \\ -17 \end{pmatrix}$$

Find the values of p and q .



Ade's answer: $p = \frac{29}{2}$ and $q = -\frac{63}{4}$



Belle's answer: $p = 2$ and $q = -3$



Chloe's answer: $p = -\frac{22}{9}$ and $q = \frac{65}{9}$



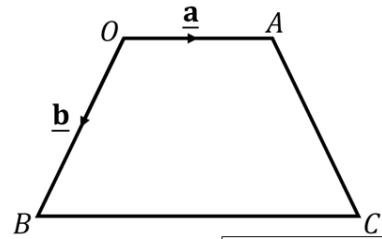
Dean's answer: $p = 6$ and $q = 3$

Question 6

The shape $OACB$ is a trapezium.

$$\overrightarrow{OA} = \underline{\mathbf{a}} \text{ and } \overrightarrow{OB} = \underline{\mathbf{b}}$$
$$\overrightarrow{BC} = 2\overrightarrow{OA}$$

Find, in terms of $\underline{\mathbf{a}}$ and $\underline{\mathbf{b}}$, the vector $\overrightarrow{AC}$.
Give your answer in its simplest form.



Ade's answer: $3\underline{\mathbf{a}} + \underline{\mathbf{b}}$



Belle's answer: $\underline{\mathbf{a}} - \underline{\mathbf{b}}$



Chloe's answer: $\underline{\mathbf{a}} + \underline{\mathbf{b}}$



Dean's answer: $-\underline{\mathbf{a}} + \underline{\mathbf{b}} + 2\underline{\mathbf{a}}$

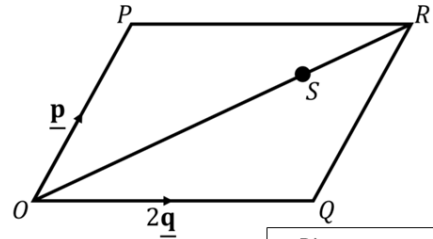
Question 7

Shape $OPRQ$ is a parallelogram.

$$\overrightarrow{OP} = \underline{\mathbf{p}} \text{ and } \overrightarrow{OQ} = 2\underline{\mathbf{q}}$$

The point S is such that $OS:SR$ is $3:1$.

Find, in terms of $\underline{\mathbf{p}}$ and $\underline{\mathbf{q}}$, in its simplest form, the vector $\overrightarrow{PS}$.



Ade's answer: $\frac{3}{4}\underline{\mathbf{q}} - \frac{1}{4}\underline{\mathbf{p}}$



Belle's answer: $\frac{3}{2}\underline{\mathbf{q}} - \frac{1}{4}\underline{\mathbf{p}}$



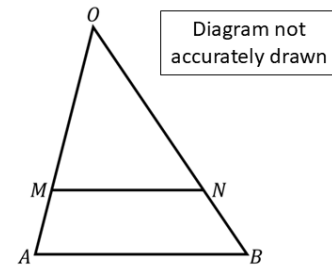
Chloe's answer: $\frac{3}{4}\underline{\mathbf{p}} - \frac{1}{2}\underline{\mathbf{q}}$



Dean's answer: $\frac{2}{3}\underline{\mathbf{q}} - \frac{1}{3}\underline{\mathbf{p}}$

Question 8

OAB is a triangle.
 $\overrightarrow{OA} = \underline{\mathbf{a}}$ and $\overrightarrow{OB} = \underline{\mathbf{b}}$
 The ratio $OM:MA$ is 2: 1.
 The ratio $BN:NO$ is 1: 2.
 Use vectors to show that AB and MN are parallel.



Ade's answer: $\overrightarrow{AB} = \underline{\mathbf{a}} + \underline{\mathbf{b}}$
 $\overrightarrow{MN} = \frac{2}{3}(\underline{\mathbf{a}} + \underline{\mathbf{b}})$



Belle's answer: $\overrightarrow{AB} = \underline{\mathbf{b}} - \underline{\mathbf{a}}$
 $\overrightarrow{MN} = \frac{1}{2}(\underline{\mathbf{b}} - \underline{\mathbf{a}})$



Chloe's answer: $\overrightarrow{AB} = \underline{\mathbf{b}} - \underline{\mathbf{a}}$
 $\overrightarrow{NM} = -\frac{2}{3}(\underline{\mathbf{b}} - \underline{\mathbf{a}})$



Dean's answer: $\overrightarrow{AB} = \underline{\mathbf{b}} - \underline{\mathbf{a}}$
 $\overrightarrow{NM} = -\frac{2}{3}(\underline{\mathbf{a}} - \underline{\mathbf{b}})$

Question 9

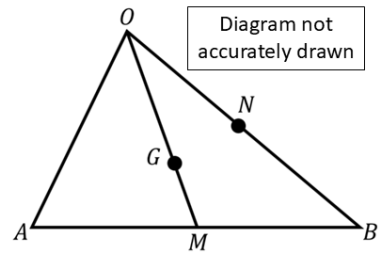
OAB is a triangle.

The point G is on the line OM .

The point N is on the line OB .

$$\overrightarrow{AG} = 3\mathbf{a} + 6\mathbf{b} \text{ and } \overrightarrow{AN} = 4\mathbf{a} + 8\mathbf{b}$$

Using the vectors for $\overrightarrow{AG}$ and $\overrightarrow{AN}$, make a comment on the points A , G and N .



Ade's answer: $\overrightarrow{GN}$ is half the length of $\overrightarrow{AG}$.



Belle's answer: $\overrightarrow{AN}$ is four times the length of $\overrightarrow{GN}$



Chloe's answer: $\overrightarrow{AG}$ is four times the length of $\overrightarrow{GN}$



Dean's answer: $\overrightarrow{AG}$ is a three times the length of $\overrightarrow{NG}$

Question 10

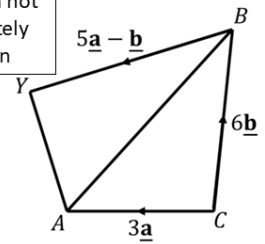
$ACBY$ is a quadrilateral.

$$\overrightarrow{CA} = 3\mathbf{a}, \overrightarrow{CB} = 6\mathbf{b} \text{ and } \overrightarrow{BY} = 5\mathbf{a} - \mathbf{b}$$

X is a point on AB such that $AX:XB = 1:2$.

Find the value of k in this description: $\overrightarrow{CX} = k\overrightarrow{CY}$

Diagram not
accurately
drawn



Ade's answer: $\frac{1}{2}$



Belle's answer: $\frac{5}{2}$



Chloe's answer: $\frac{2}{5}$



Dean's answer: $\frac{2}{3}$