Explain The Errors… Vectors



Four friends (Ade, Belle, Chloe and Dean) have been doing some maths questions.



In each case, just one of the friends has got the question correct.

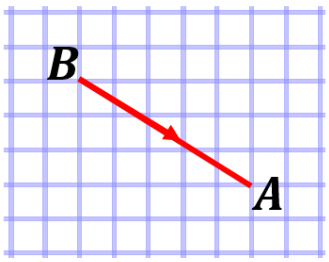
Work out who got the correct answer, then work out what those who got the question incorrect have done to get their answer.





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

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

Fill in the blank in the sentence below:

Vector $\underline{\mathbf{a}}$ is _____ times the length of vector $\underline{\mathbf{b}}$.



Ade's answer: 2



Belle's answer: -2



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



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

Question 3

$\underline{\mathbf{p}} = \begin{pmatrix} 5 \\ 3 \end{pmatrix}$ 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

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