

Question 1 (4 Marks)

Show that $\frac{8 + \sqrt{12}}{5 + \sqrt{3}}$ can be written in the form $\frac{a + \sqrt{3}}{b}$, where a and b are integers.

Question 2 (3 Marks)

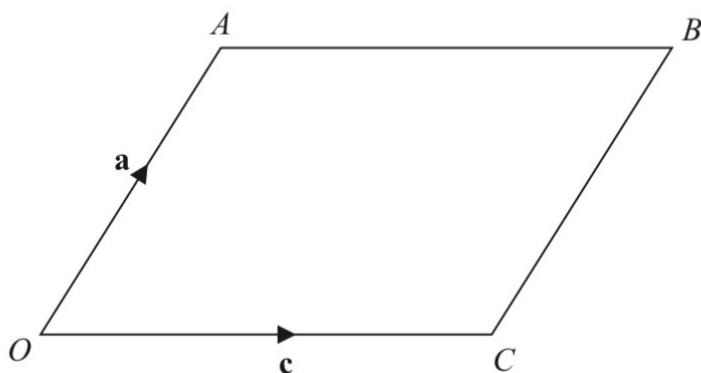
Alfie has 11 cards.

He has

3 blue cards
7 green cards
and 1 white card.

Alfie takes at random 2 of these cards.

Work out the probability that he takes cards of different colours.

Question 3 (4 Marks)

$OABC$ is a parallelogram.

$$\overrightarrow{OA} = \mathbf{a} \text{ and } \overrightarrow{OC} = \mathbf{c}$$

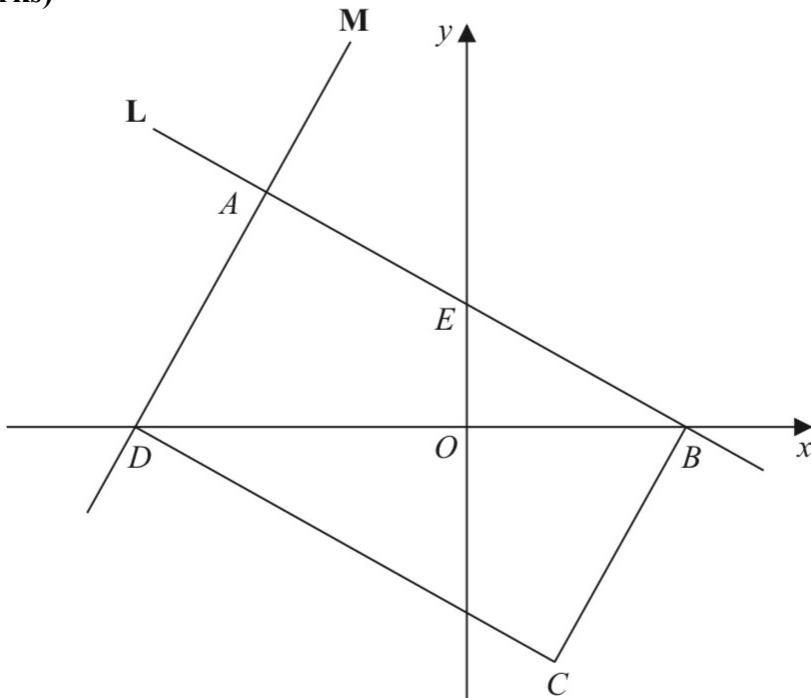
X is the midpoint of the line AC .

OCD is a straight line so that $OC : CD = k : 1$

$$\text{Given that } \overrightarrow{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a}$$

find the value of k .

$$k = \dots$$

Question 3 (4 Marks)

$ABCD$ is a rectangle.

A , E and B are points on the straight line L with equation $x + 2y = 12$
 A and D are points on the straight line M .

$$AE = EB$$

Find an equation for M .