Areas of Parallelograms and Triangles Ex 15.3 Q15

Answer :

Given: Here from the given figure we get

(1) ABCD is a parallelogram with base AB,

(2) BC is produced to E such that CE = BC

(3) AE intersects CD at F

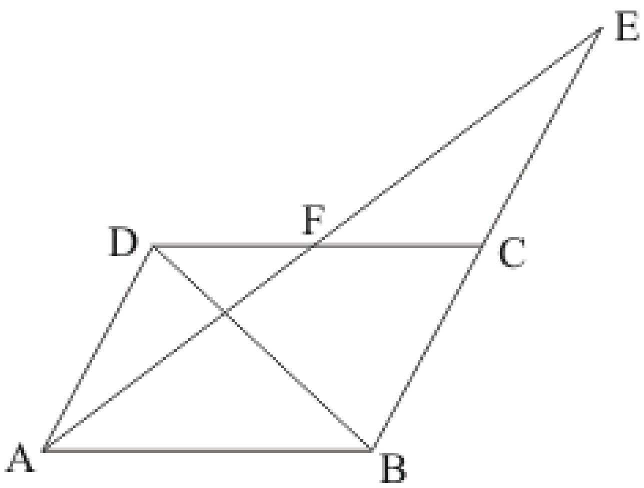
(4) Area of $\Delta DFB = 3\ cm^2$

To find:

(a) Area of ΔADF = Area of ΔECF

(b) Area of parallelogram ABCD

Proof: Δ ADF and ΔECF, we can see that



$\angle ADF = \angle ECF$ (Alternate angles formed by parallel sides AD and CE)

$AD = EC$

$\angle DFA = \angle CFA$ (Vertically opposite angles)

$\Rightarrow \Delta ADF \cong \Delta EFC$ (ASA condition of congruence)

$\Rightarrow$ Area of ΔADF = Area of ΔEFC

As $\Delta ADF \cong \Delta EFC$

$\Rightarrow DF = CF$

Since $DF = CF$. So BF is a median in ΔBCD

Since median divides the triangle in to two equal triangles. So

Area of $\Delta BCD = 2 \times$ Area of ΔBDF

Since $\text{Area}(\Delta BDF) = 3\ \text{cm}^2$ .So

$\text{Area}(\Delta BCD) = 2 \times 3$

$\Rightarrow \qquad = 6\text{cm}$

Hence Area of parallelogram ABCD

$= 2 \times \text{Area}(\Delta BCD)$

$= 2 \times 6$

$= 12\ \text{cm}^2$

Hence we get the result

(a) $\boxed{\text{Area of } \Delta ADF = \text{Area of } \Delta ECF}$

(b) $\boxed{\text{Area of parellelogram ABCD} = 12\ \text{cm}^2}$

Areas of Parallelograms and Triangles Ex 15.3 Q16

Answer :

Given:

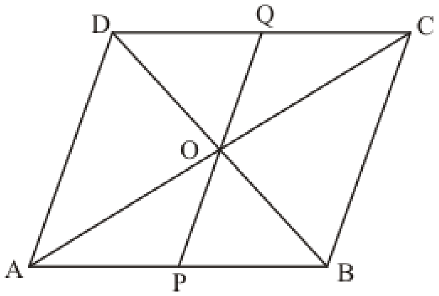
(1) Diagonals AC and BD of a parallelogram ABCD intersect at point O.

(2) A line through O intersects AB at P point.

(3) A line through O intersects DC at Q point.

To find: Area of (ΔPOA) = Area of (ΔQOC)

Proof:



From ΔPOA and ΔQOC we get that

$\angle AOP = \angle COQ$

$OA = OC$

$\angle PAC = \angle QCA$

So, by ASA congruence criterion, we have

$\Delta POA \cong \Delta QOC$

So

Area (ΔPOA) = Area (ΔQOC)

Hence it is proved that $\boxed{\text{Area}(\Delta POA) = \text{Area}(\Delta QOC)}$

*********** END **********