Areas of Parallelograms and Triangles Ex 15.3 Q20

Answer :

Given:

(1) CD||AE.

(2) CY||BA.

To find:

(i) Name a triangle equal in area of ΔCBX.

(ii) $ar(\Delta ZDE) = ar(\Delta CZA)$.

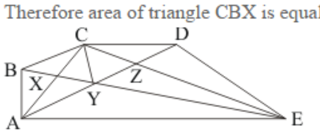
(iii) $ar(BCZY) = ar(\Delta EDZ)$.

Proof:

(i) Since triangle BCY and triangle YCA are on the same base and between same parallel, so their area should be equal. Therefore

$$ar(\Delta BCY) = ar(\Delta YCA)$$
$$\Rightarrow ar(\Delta CBX) + ar(\Delta XYC) = ar(\Delta XYC) + ar(\Delta AXY)$$
$$\Rightarrow ar(\Delta CBX) = ar(\Delta AXY)$$

Therefore area of triangle CBX is equal to area of triangle AXY



(ii) Triangle ADE and triangle ACE are on the same base AE and between the same parallels AE and CD.

$$\Rightarrow \quad ar(\Delta ADE) = ar(\Delta ACE)$$
$$\Rightarrow \quad ar(\Delta ADE) - ar(\Delta AZE) = ar(\Delta ACE) - ar(\Delta AZE)$$
$$\Rightarrow \quad \boxed{ar(\Delta ZDE) = ar(\Delta ACZ)}$$

(iii) Triangle ACY and BCY are on the same base CY and between same parallels CY and BA. So we have

$$ar(\Delta ACY) = ar(\Delta BCY)$$

Now we know that

$$ar(\Delta ACZ) = ar(\Delta ZDE)$$
$$\Rightarrow \quad ar(\Delta ACY) + ar(\Delta CYZ) = ar(\Delta EDZ)$$
$$\Rightarrow \quad ar(\Delta BCY) + ar(\Delta CYZ) = ar(\Delta EDZ)$$
$$\Rightarrow \quad \boxed{ar(\Delta BCY) = ar(\Delta EDZ)}$$

Areas of Parallelograms and Triangles Ex 15.3 Q21

Answer :

Given:

(i) PSDA is a parallelogram.

(ii) $PQ = QR = RS$.

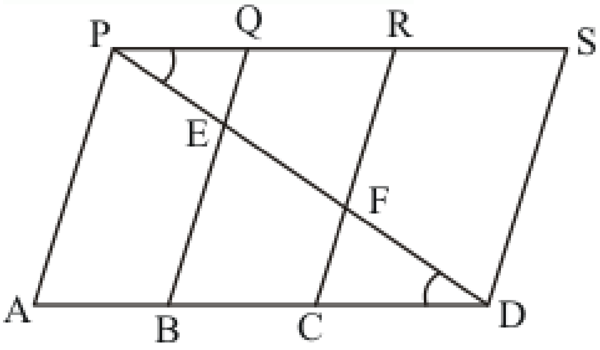
(iii) $AP \parallel BQ \parallel CR$.

To find:

$ar(\Delta PQE) = ar(\Delta CFD)$

Proof:

since $AP \parallel BQ \parallel CR \parallel DS$.



Since $AP \parallel BQ \parallel CR \parallel DS$ and $AD \parallel PS$

So $PQ = CD$ ...... (1)

In ΔBED, C is the mid point of BD and $CF \parallel BE$

This implies that F is the mid point of ED. So

$EF = FD$ ...... (2)

In ΔPQE and ΔCFD, we have

$PE = FD$

$\angle EPQ = \angle FDC$, and [Alternate angles]

$PQ = CD$.

So, by SAS congruence criterion, we have

$\Delta PQE = \Delta DCF$

$\boxed{\Rightarrow ar(\Delta PQE) = ar(\Delta DCF)}$

Hence proved that

$\boxed{ar(\Delta PQE) = ar(\Delta DCF)}$

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