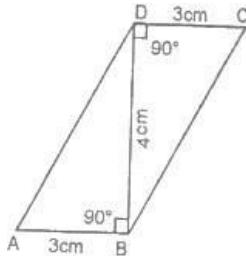
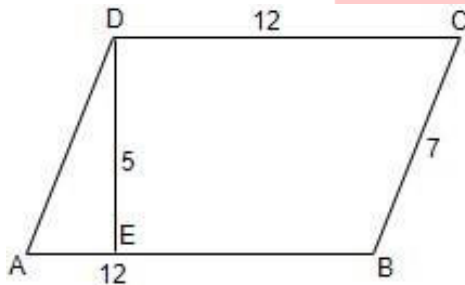


CBSE Test Paper 01
CH-9 Areas of Parallelograms & Triangles

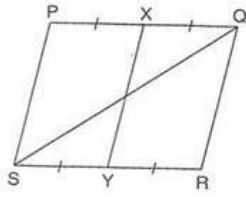
1. The area of the parallelogram ABCD in the figure is :



- a. 12 cm^2
b. 10 cm^2
c. 9 cm^2
d. 15 cm^2
2. Find the area of parallelogram in the adjoining figure.

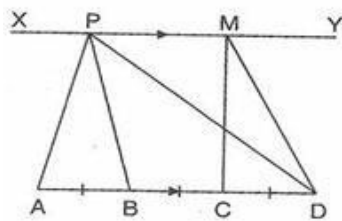


- a. 60 square feet
b. 48 square feet
c. 1759 feet
d. 84 square feet
3. PQRS is a parallelogram. If X and Y are mid-points of PQ and SR and diagonal SQ is joined, then $ar(\parallel XQRY) : ar(\triangle QSR)$ is equal to



- a. it is 2 : 1.
- b. it is 1 : 2.
- c. it is 1 : 1.
- d. it is 1 : 4.

4. Points A, B, C, and D are collinear. $AB = BC = CD$. $XY \parallel AD$. If P and M lie on XY and $ar(\triangle MCD) = 7 \text{ cm}^2$, then $ar(\triangle APB)$ and $ar(\triangle APD)$ respectively are



- a. $7 \text{ cm}^2, 21 \text{ cm}^2$.
- b. $7 \text{ cm}^2, 14 \text{ cm}^2$.
- c. $14 \text{ cm}^2, 14 \text{ cm}^2$.
- d. $14 \text{ cm}^2, 21 \text{ cm}^2$.

5. If the sum of the parallel sides of a trapezium is 7 cm and distance between them is 4 cm, then area of the trapezium is :

- a. 7 cm^2
- b. 21 cm^2
- c. 14 cm^2
- d. 28 cm^2

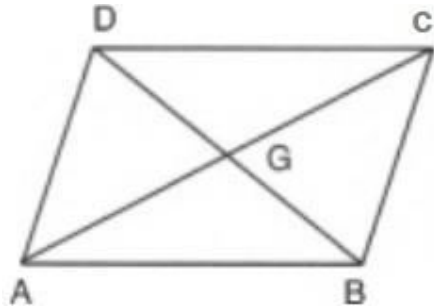
6. Fill in the blanks:

The area of a rhombus is equal to _____ of the product of its two diagonals.

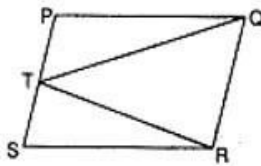
7. Fill in the blanks:

A median of a triangle divides it into _____ triangles of equal areas.

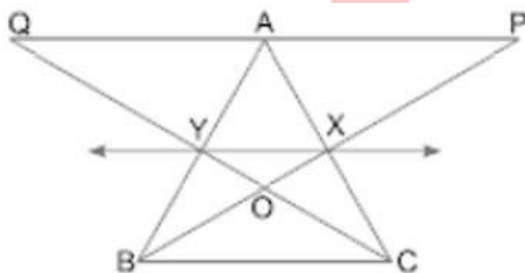
8. In a given figure, it is given that $AD \parallel BC$. Prove that $\text{ar}(\triangle CGD) = \text{ar}(\triangle ABG)$.



9. Is the given figure lie on the same base and between a same parallels. In such a case, write the common base and the two parallels :

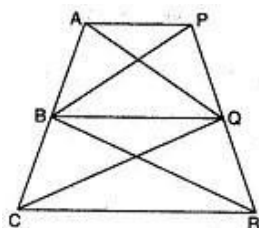


10. In Fig, X and Y are the mid-points of AC and AB respectively, $QP \parallel BC$ and CYQ and BXP are straight lines. Prove that $\text{ar}(\triangle ABP) = \text{ar}(\triangle ACQ)$.

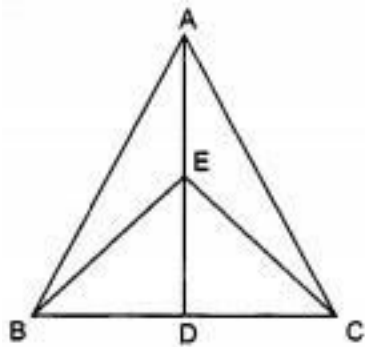


11. ABCD is a parallelogram. P is any point on CD. If $\text{area}(\triangle DPA) = 15 \text{ cm}^2$ and $\text{area}(\triangle APC) = 20 \text{ cm}^2$, find the $\text{area}(\triangle APB)$.

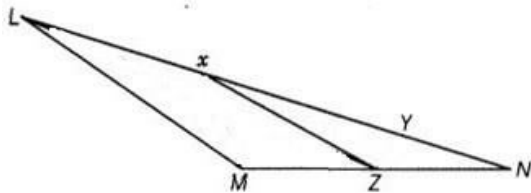
12. In figure, $AP \parallel BQ \parallel CR$. Prove that $\text{ar}(\triangle AQC) = \text{ar}(\triangle PBR)$.



13. D and E are mid-points of BC and AD respectively. If area of $\triangle ABC = 10 \text{ cm}^2$, find area of $\triangle EBD$.



14. In the given Fig., X and Y are points on the side LN of the triangle LMN such that $LX = XY = YN$. Through X, a line is drawn parallel to LM to meet MN at Z. Prove that $\text{ar}(\triangle LZY) = \text{ar}(\triangle MZYX)$.



15. If AD is a median of a triangle ABC, then prove that triangles ADB and ADC are equal in area. If G is the mid-point of median AD, prove that $\text{ar}(\triangle BGC) = 2\text{ar}(\triangle AGC)$.

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Solution

1. (a) 12 cm^2

Explanation:

$$\begin{aligned} \text{Area of parallelogram} &= \text{Base} \times \text{Height} \\ &= AB \times BD \\ &= 3 \times 4 \\ &= 12 \text{ cm}^2 \end{aligned}$$

2. (a) 60 square feet

Explanation:

In the figure, Base AB = 12 feet and Corresponding height DE = 5 feet

Then

$$\begin{aligned} \text{Area of parallelogram ABCD} &= \text{Base} \times \text{Corresponding height} \\ &= AB \times DE \\ &= 12 \times 5 \\ &= 60 \text{ square feet} \end{aligned}$$

3. (c) it is 1 : 1.

Explanation:

Since parallelogram PQRS and triangle PQS are on the same base QS and between the same parallels, then

$$\text{ar}(\triangle PQS) = \frac{1}{2} \times \text{ar}(\parallel gm PQRS) \quad \dots\dots\dots(i)$$

Also, if X and Y are mid-points of PQ and SR and diagonal SQ is joined, then

$$\text{area}(\parallel gm XQRY) = \frac{1}{2} \times \text{area}(\parallel gm PQRS) \quad \dots\dots\dots(ii)$$

From eq.(i) and (ii), we get

$$\begin{aligned} \text{area}(\triangle PQS) &= \text{area}(\parallel gm XQRY) \\ \Rightarrow \text{area}(\parallel gm XQRY) : \text{area}(\triangle PQS) &= 1 : 1 \end{aligned}$$

4. (a) 7 cm^2 , 21 cm^2 .

Explanation:

Since triangles MCD and PAB are on the same base and between the same parallels, then

$$\text{area}(\triangle MCD) = \text{area}(\triangle PAB) = 7 \text{ sq. cm}$$

Now, since $AB = BC = CD$, then

$$AB = \frac{1}{3} AD \text{ and } BC = \frac{2}{3} AD$$

$$\text{Then, area}(\triangle APB) = \frac{1}{3} \times \text{area}(\triangle APD)$$

$$\Rightarrow \frac{1}{3} \times \text{area}(\triangle APD) = 7 \text{ sq. cm}$$

$$\Rightarrow \text{area}(\triangle APD) = 21 \text{ sq. cm}$$

5. (c) 14 cm^2

Explanation:

Given: Sum of the parallel sides of a trapezium is 7 cm and distance between them is 4 cm.

$$\text{Area of the trapezium} = \frac{1}{2} (\text{Sum of parallel sides}) \times \text{Height}$$

$$= \frac{1}{2} \times 7 \times 4$$

$$= 14 \text{ cm}^2$$

6. $\frac{1}{2}$

7. two

8. Since $\triangle ADC$ and $\triangle ADB$ are on the same base AD and between the same parallels AD and BC.

$$\text{ar}(\triangle ADC) = \text{ar}(\triangle ADB)$$

$$\Rightarrow \text{ar}(\triangle ADC) - \text{ar}(\triangle ADG) = \text{ar}(\triangle ADB) - \text{ar}(\triangle ADG)$$

$$\Rightarrow \text{ar}(\triangle CGD) = \text{ar}(\triangle ABG)$$

9. $\triangle TRQ$ and parallelogram SRQP lie on the same base RQ and between the same parallels RQ and SP.

10. From the given figure it is clear that X and Y are the mid-points of AC and AB respectively.

Therefore, $XY \parallel BC$

Since $\triangle BYC$ and $\triangle BXC$ are on the same base BC and between the same parallels XY and BC, we can write

$$\begin{aligned} \text{ar}(\triangle BYC) &= \text{ar}(\triangle BXC) \\ \Rightarrow \text{ar}(\triangle BYC) - \text{ar}(\triangle BOC) &= \text{ar}(\triangle BXC) - \text{ar}(\triangle BOC) \\ \Rightarrow \text{ar}(\triangle BOY) &= \text{ar}(\triangle COX) \\ \Rightarrow \text{ar}(\triangle BOY) + \text{ar}(\triangle XOY) &= \text{ar}(\triangle COX) + \text{ar}(\triangle XOY) \\ \Rightarrow \text{ar}(\triangle BXY) &= \text{ar}(\triangle CXY) \dots\dots\dots(i) \end{aligned}$$

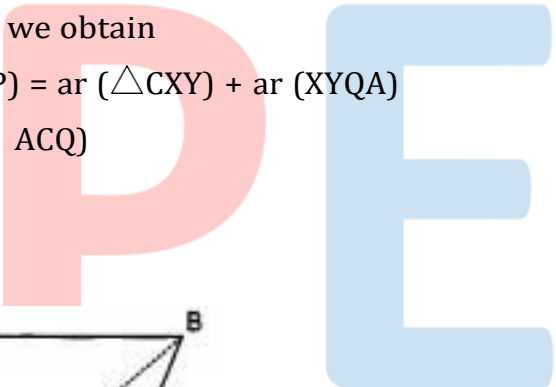
Since quadrilaterals XYAP and XYQA are on the same base XY and between the same parallels XY and PQ, we have

$$\text{ar}(XYAP) = \text{ar}(XYQA) \dots\dots\dots(ii)$$

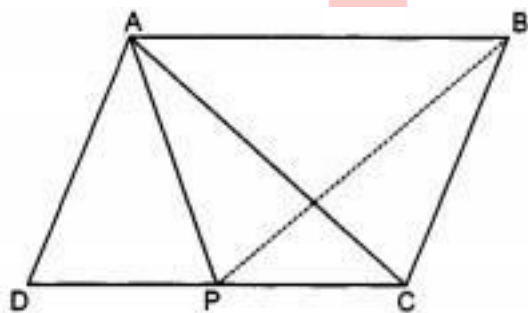
On adding (i) and (ii), we obtain

$$\begin{aligned} \text{ar}(\triangle BXY) + \text{ar}(XYAP) &= \text{ar}(\triangle CXY) + \text{ar}(XYQA) \\ \Rightarrow \text{ar}(\triangle ABP) &= \text{ar}(\triangle ACQ) \end{aligned}$$

Hence proved.



11.



From the given figure it is clear that $\text{area}(\triangle ADC) = \text{area}(\triangle ADP) + \text{area}(\triangle APC) = 15 + 20 = 35 \text{ cm}^2$

Now in parallelogram opposite sides are equal i.e., $CD = AB$,

Also $AB \parallel CD$.

Now, we know that triangles having same base and lie with the same parallels have the same area.

$$\therefore \text{area of } \triangle ABP = \text{area of } \triangle ADC = 35 \text{ cm}^2$$

12. Given : AP || BQ || CR

To Prove : ar(Δ AQC) = ar(Δ PBR)

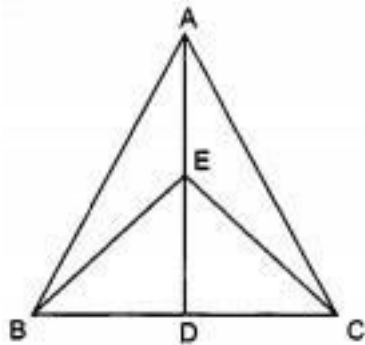
Proof : ar(Δ BAQ) = ar(Δ BPQ) [Δ s on the base BQ and between the same parallels BQ and AP] . . . (1)

ar(Δ BCQ) = ar(Δ BQR) [Δ s on the base BQ and between the same parallels BQ and CR] . . . (2)

ar(Δ BAQ) + ar(Δ BCQ) = ar(Δ BPQ) + ar(Δ BQR) . . . [Adding corresponding sides of (1) and (2)]

⇒ ar(Δ AQC) = ar(Δ PBR)

13. It is given that D is the midpoint of BC, therefore we can say that AD is the median.



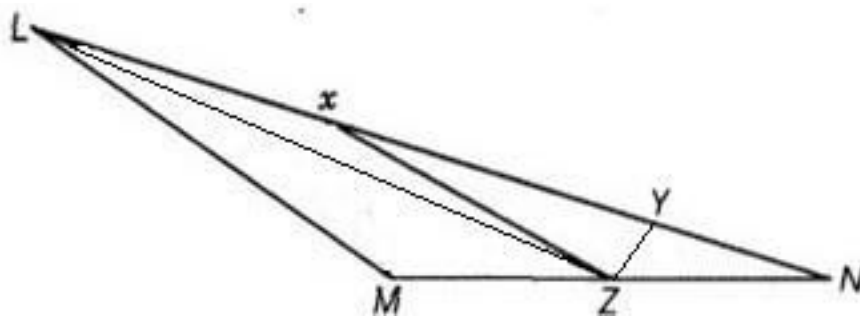
Now, Area of Δ ABD = $\frac{1}{2}$ × area of Δ ABC [Median divides a triangle into two triangles of the equal area]

Thus, Area of Δ ABD = $\frac{1}{2}$ × 10 cm² = 5 cm²

Again, BE is the median of Δ ABD.

$$\begin{aligned} \therefore \text{Area of } \triangle EBD &= \frac{1}{2} \times \text{area of } \triangle ABD \\ &= \frac{1}{2} \times 5 = 2.5 \text{ cm}^2 \end{aligned}$$

14. From the given figure,



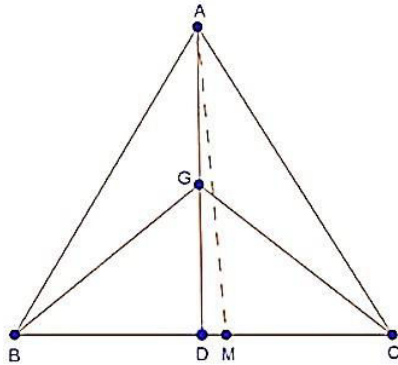
it is clear that Δ LXZ and Δ MXZ (adding x and M) lie on the same base XZ and between the same parallels XZ and LM.

$$\therefore \text{ar}(\triangle LXZ) = \text{ar}(\triangle MXZ)$$

Adding $\text{ar}(\triangle XYZ)$ on both sides, we obtain
 $\text{ar}(\triangle LXZ) + \text{ar}(\triangle XYZ) = \text{ar}(\triangle MXZ) + \text{ar}(\triangle XYZ)$
 $\Rightarrow \text{ar}(\triangle LYZ) = \text{ar}(\triangle MZYX)$

Hence proved

15.



Draw $AM \perp BC$.

Since, AD is the median of $\triangle ABC$,

$$\therefore BD = DC$$

$$\Rightarrow BD \times AM = DC \times AM$$

$$\Rightarrow \frac{1}{2} (BD \times AM) = \frac{1}{2} (DC \times AM)$$

$$\Rightarrow \text{ar}(\triangle ABD) = \text{ar}(\triangle ACD) \dots\dots (i)$$

In $\triangle BGC$, GD is the median,

$$\therefore \text{ar}(\triangle BGD) = \text{ar}(\triangle CGD) \dots (ii)$$

In $\triangle ACD$, CG is a median,

$$\therefore \text{ar}(\triangle AGC) = \text{ar}(\triangle CGD) \dots\dots(iii)$$

From (ii) and (iii), we have,

$$\text{ar}(\triangle BGD) = \text{ar}(\triangle AGC)$$

$$\text{But, ar}(\triangle BGC) = 2\text{ar}(\triangle BGD)$$

$$\therefore \text{ar}(\triangle BGC) = 2 \text{ar}(\triangle AGC)$$