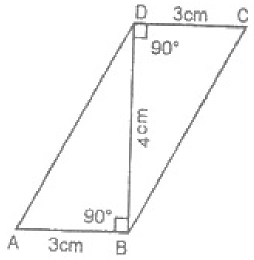
CBSE Test Paper 01

CH-9 Areas of Parallelograms & Triangles

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



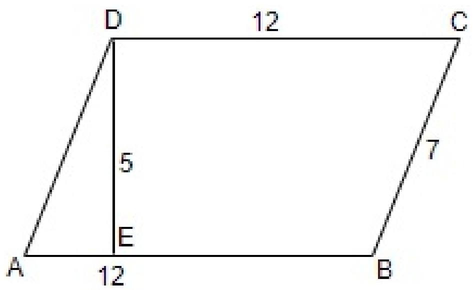
   a. $12\,cm^2$

   b. $10\ cm^2$

   c. $9\ cm^2$

   d. $15\ cm^2$

2. Find the area of parallelogram in the adjoining figure.



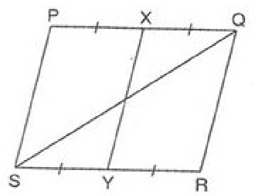
   a. 60 square feet

   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 $ar(\|\ \ XQRY)$: $ar(\triangle QSR)$ is equal to



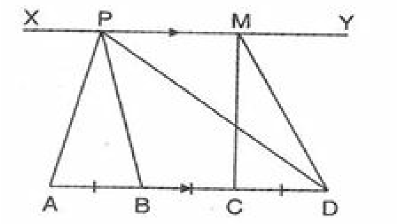
a. it is 2 : 1.

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 $ar(\triangle MCD) = 7\ cm^2$, then $ar\ (\triangle APB)$ and $ar\ (\triangle APD)$ respectively are



a. $7\ cm^2,\ 21\ cm^2.$

b. $7\ cm^2, 14\ cm^2.$

c. $14\ cm^2, 14\,cm^2.$

d. $14\ cm^2,\ 21\ cm^2.$

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. $28\ cm^2$

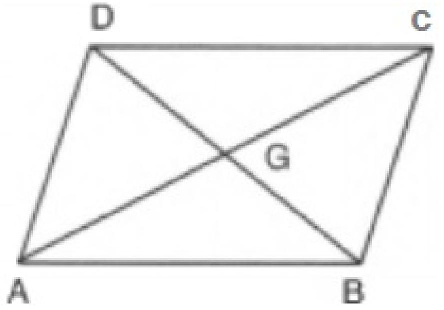
6. Fill in the blanks:

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

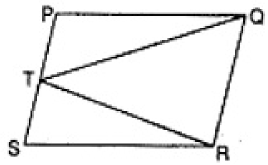
7. Fill in the blanks:

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

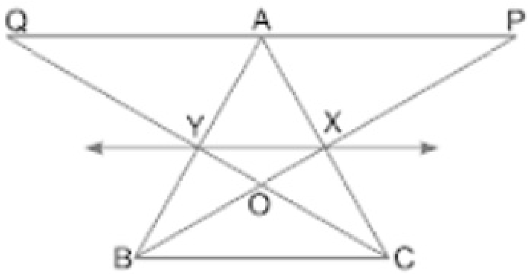
8. In a given figure, it is given that AD || BC. Prove that ar(△CGD) = ar(△ABG).



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 :

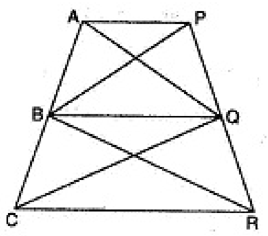


10. In Fig., X and Y are the mid-points of AC and AB respectively, QP || BC and CYQ and BXP are straight lines. Prove that ar (△ABP) = ar (△ACQ).

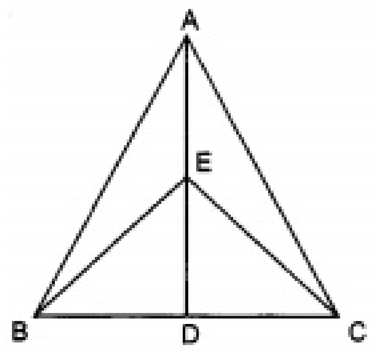


11. ABCD is a parallelogram. P is any point on CD. If area(△DPA) = 15 cm^2 and area (△APC) = 20 cm^2, find the area(△APB).

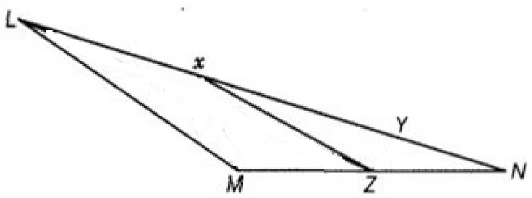
12. In figure, AP || BQ || CR. Prove that ar(AQC) = ar(PBR).



13. D and E are mid-points of BC and AD respectively. If area of △ABC = 10 cm^2, find area of △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 ar (△LZY) = ar (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 ar(△BGC) = 2ar(△AGC).

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Solution

1. (a) $12\,cm^2$

   Explanation:

   Area of parallelogram = Base $\times$ Height

   = AB $\times$ BD

   = 3 $\times$ 4

   = 12 cm^2
2. (a) 60 square feet

   Explanation:

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

   Then

   Area of parallelogram ABCD = Base $\times$ Corresponding height

   = AB $\times$ DE

   = 12 $\times$ 5

   = 60 square feet
3. (c) it is 1 : 1.

   Explanation:

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

   $\text{ar}\,(\triangle\text{PQS}) = \frac{1}{2} \times \text{ar}\,(\| gm\text{PQRS})$ ....(i)

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

   $\text{area}\,(\| gm\text{XQRY}) = \frac{1}{2} \times \text{area}\,(\| gm\text{PQRS})$ ....(ii)

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

   $\text{area}\,(\triangle\text{PQS}) = \text{area}\,(\| gm\text{XQRY})$

   $\Rightarrow \text{area}\,(\| gm\text{XQRY}) : \text{area}\,(\triangle\text{PQS}) = 1 : 1$
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
$\text{area}\,(\triangle \text{MCD}) = \text{area}\,(\triangle \text{PAB}) = 7$ sq. cm
Now, since AB = BC = CD, then
AB = $\frac{1}{3}$ AD and BC = $\frac{2}{3}$ AD
Then, $\text{area}\,(\triangle \text{APB}) = \frac{1}{3} \times \text{area}\,(\triangle \text{APD})$
$\Rightarrow \frac{1}{3} \times \text{area}\,(\triangle \text{APD}) = 7$ sq. cm
$\Rightarrow\ \text{area}\,(\triangle \text{APD}) = 21$ 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.

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

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

= 14 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.
ar($\triangle$ADC) = ar($\triangle$ADB)
$\Rightarrow$ ar($\triangle$ADC) - ar($\triangle$ADG) = ar($\triangle$ADB) - ar($\triangle$ADG)
$\Rightarrow$ ar($\triangle$CGD) = 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

ar ($\triangle$BYC) = ar ($\triangle$BXC)

$\Rightarrow$ar ($\triangle$BYC) - ar ($\triangle$BOC) = ar ($\triangle$BXC) - ar ($\triangle$BOC)

$\Rightarrow$ ar ($\triangle$BOY) = ar ($\triangle$COX)

$\Rightarrow$ar ($\triangle$BOY) + ar ($\triangle$XOY) = ar ($\triangle$COX) + ar ($\triangle$XOY)

$\Rightarrow$ar ($\triangle$BXY) = ar ($\triangle$CXY) ....(i)

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

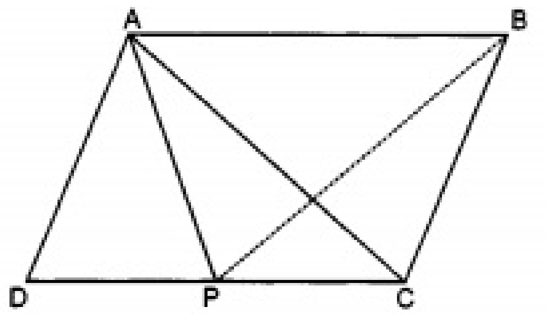
ar(XYAP) = ar (XYQA) ....(ii)

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

ar ($\triangle$BXY) + ar (XYAP) = ar ($\triangle$CXY) + ar (XYQA)

$\Rightarrow$ar ($\triangle$ABP) = ar ($\triangle$ ACQ)

Hence proved.

11. 

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

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

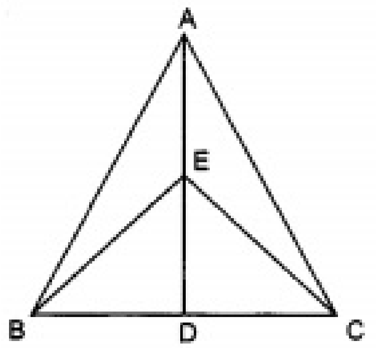
Also $AB \parallel CD$.

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

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

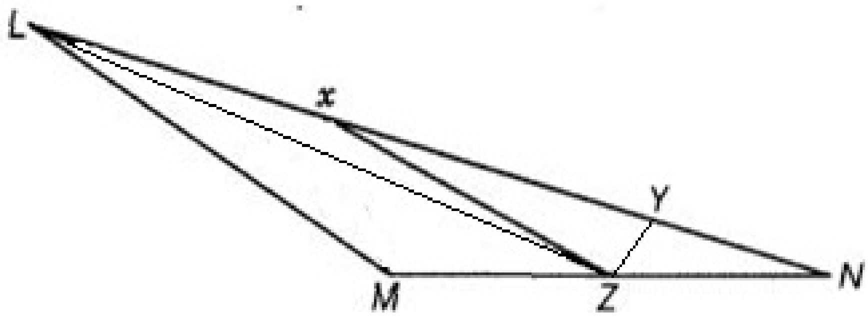
12. Given : AP || BQ || CR
To Prove : ar($\triangle$AQC) = ar($\triangle$PBR)
Proof : ar($\triangle$BAQ) = ar($\triangle$BPQ) . . . .[$\triangle$s on the base BQ and between the same parallels BQ and AP] . . . (1)
ar($\triangle$BCQ) = ar($\triangle$BQR) . . . .[$\triangle$s on the base BQ and between the same parallels BQ and CR] . . . (2)
ar($\triangle$BAQ) + ar($\triangle$BCQ) = ar($\triangle$BPQ) + ar($\triangle$BQR) . . . [Adding corresponding sides of (1) and (2)]
$\Rightarrow$ ar($\triangle$AQC) = ar($\triangle$PBR)

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



Now, Area of $\triangle$ABD = $\frac{1}{2} \times$ area of $\triangle$ABC ....[Median divides a triangle into two triangles of the equal area]
Thus, Area of $\triangle$ABD = $\frac{1}{2} \times 10$ cm^2 = 5 cm^2
Again, BE is the median of $\triangle$ABD.
$\therefore$ Area of $\triangle$EBD = $\frac{1}{2} \times$ area of $\triangle$ABD
= $\frac{1}{2} \times 5$ = 2.5 cm^2

14. From the given figure,



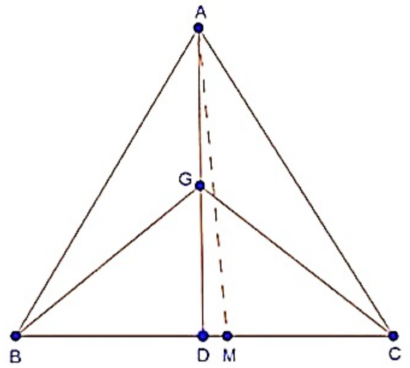
it is clear that $\triangle$LXZ and $\triangle$MXZ (adding x and M) lie on the same base XZ and between the same parallels XZ and LM.
$\therefore$ ar($\triangle$LXZ) = ar($\triangle$MXZ)

Adding ar($\triangle$XYZ) on both sides, we obtain

ar($\triangle$LXZ) + ar($\triangle$XYZ) = ar($\triangle$MXZ) + ar($\triangle$XYZ)

$\Rightarrow$ar ($\triangle$LYZ) = ar(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)

$\Rightarrow$ ar($\triangle$ABD) = ar($\triangle$ACD) .....(i)

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

$\therefore$ ar($\triangle$BGD) = ar($\triangle$CGD) ....(ii)

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

$\therefore$ ar($\triangle$AGC) = ar($\triangle$CGD) .....(iii)

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

ar($\triangle$BGD) = ar($\triangle$AGC)

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

$\therefore$ ar($\triangle$BGC) = 2 ar($\triangle$AGC)