Exercise No. 9.1

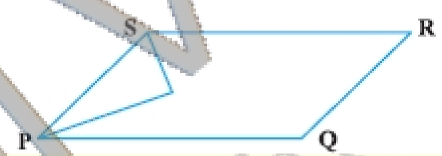
Multiple Choice Questions:

Write the correct answer in each of the following:

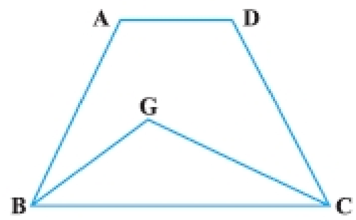
1. The median of a triangle divides it into two
(A) triangles of equal area
(B) congruent triangles
(C) right triangles
(D) isosceles triangles

Solution:
A median of a triangle divides it into two triangles of equal area.
Hence, the correct option is (A).

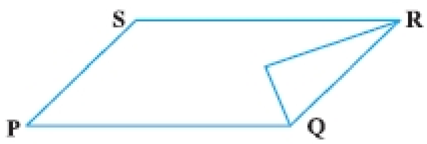
2. In which of the following figures, you find two polygons on the same base and between the same parallels?
(A)



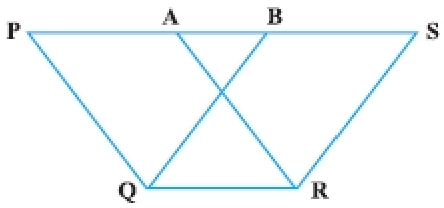
(B)



(C)



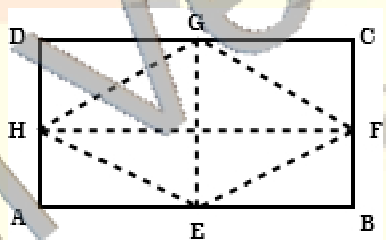
(D)



Solution:
In figure (d), we find two polygons (PQRA and BQRS) on the same base and between the same parallels.
Hence, the correct option is (D).

3. The figure obtained by joining the mid-points of the adjacent sides of a rectangle of sides 8 cm and 6 cm is:
(A) a rectangle of area 24 cm^2**.**
(B) a square of area 25 cm^2**.**
(C) a trapezium of area 24 cm^2**.**
(D) a rhombus of area 24 cm^2**.**

Solution:
According to the question,



ABCD is a rectangle and E, F, G and H are the mid-point of the sides AB, BC, CD and DA respectively. The figure formed is rhombus hose area:

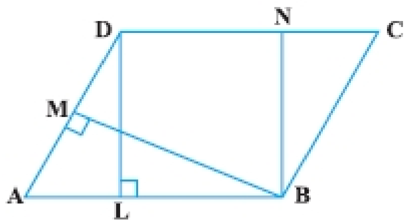
$= \frac{1}{2} \times EG \times FH$

$= \frac{1}{2} \times 6cm \times 8cm$

$= 24cm^2$

Hence, the correct option is (D).

4. In Fig., the area of parallelogram ABCD is:

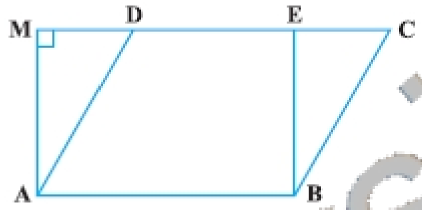


(A) AB × BM

(B) BC × BN
(C) DC × DL
(D) AD × DL

Solution:
Area of parallelogram = Base × Corresponding altitude
$= AB \times DL = DC \times DL$ [Since, AB = DC (opposite side of a parallelogram)]
Hence, the correct option is (C).

5. In Fig., if parallelogram ABCD and rectangle ABEF are of equal area, then:



(A) Perimeter of ABCD = Perimeter of ABEM
(B) Perimeter of ABCD < Perimeter of ABEM
(C) Perimeter of ABCD > Perimeter of ABEM
(D) Perimeter of ABCD $= \frac{1}{2}$(Perimeter of ABEM)

Solution:
If parallelogram ABCD and rectangle ABEF are of equal area then perimeter of ABCD > Perimeter of ABEM because:

As we know that, the perpendicular distance between two parallel sides of a parallelogram is always less than the length of the other parallel sides.
BE < BC and AM < AD.
Hence, the correct option is (C).

6. The mid-point of the sides of a triangle along with any of the vertices as the fourth point make a parallelogram of area equal to

(A) $\frac{1}{2}\text{ar}(ABC)$

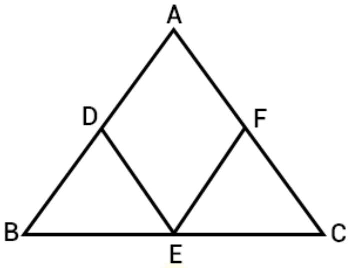
(B) $\frac{1}{3}\text{ar}(ABC)$

(C) $\frac{1}{4}\text{ar}(ABC)$

(D) $\text{ar}(ABC)$

Solution:

We know that, median of a triangle divides it into two triangle of equal area.



So, $\text{area}(\Delta ADE) = \text{area}(\Delta BDE) \quad \ldots\text{(I)}$

$\text{area}(\Delta AEF) = \text{area}(\Delta EFC) \quad \ldots\text{(II)}$

Now, AE is the diagonal of a parallelogram ADEF. That is divides it into two triangles of equal area.

So, $\text{area}(\Delta ADE) = \text{area}(\Delta AFE) \quad \ldots\text{(III)}$

Now, from equation (I), (II), and (III), get:

$\text{area}(\Delta ADE) = \text{area}(\Delta BDE) = \text{area}(\Delta AEE) = \text{area}(\Delta EFC)$

Hence, $\text{area}(\Delta ADEF) = \frac{1}{2}\text{area}(\Delta ABC)$

Therefore, the correct option is (A).

7. Two parallelograms are on equal bases and between the same parallels. The ratio of their areas is
(A) 1 : 2
(B) 1 : 1
(C) 2 : 1
(D) 3 : 1

Solution:

As we know that parallelogram on the same or equal bases and between the same parallels are equal in area.

So, the ratio of these area is 1:1.

Hence, the correct option is (B).

8. ABCD is a quadrilateral whose diagonal AC divides it into two parts, equal in area, then ABCD
(A) is a rectangle
(B) is always a rhombus
(C) is a parallelogram
(D) need not be any of (A), (B) or (C)

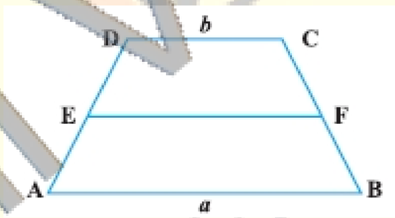
Solution:

The quadrilateral ABCD need not be any of rectangle, rhombus and parallelogram because if quadrilateral ABCD is a square then its diagonal AC also divides it into two parts which are equal in area.
Hence, the correct option is (D).

9. If a triangle and a parallelogram are on the same base and between same parallels, then the ratio of the area of the triangle to the area of parallelogram is
(A) 1 : 3
(B) 1 : 2
(C) 3 : 1
(D) 1 : 4

Solution:
As we know that, if a parallelogram and a triangle are on the same base and between the same parallels, then area of the triangle is half the area of the parallelogram. Therefore, the ratio of the area of the triangle to the area of parallelogram is 1:2.
Hence, the correct option is (B).

10. ABCD is a trapezium with parallel sides AB = *a* cm and DC = *b* cm. E and F are the mid-points of the non-parallel sides. The ratio of ar (ABFE) and ar (EFCD) is



(A) *a* : *b*
(B) (3*a* + *b*) : (*a* + 3*b*)
(C) (*a* + 3*b*) : (3*a* + *b*)
(D) (2*a* + *b*) : (3*a* + *b*)

Solution:
Given:
ABCD is a trapezium with parallel sides such that AB||DC and AB = *a* cm and DC = *b* cm. E and F are the mid-points of the non-parallel sides that are AD and BC. So,

$$EF = \frac{1}{2}(a+b)$$

ABEF and EFCD are also trapezium.

$$\text{area}(ABEF) = \frac{1}{2}\left[\frac{1}{2}(a+b)+a\right]\times h = \frac{h}{4}(3a+b)$$

$$\text{area}(EFCD) = \frac{1}{2}\left[b+\frac{1}{2}(a+b)\right]\times h = \frac{h}{4}(a+3b)$$

So,

$$\frac{\text{area}(ABEF)}{\text{area}(EFCD)}=\frac{\frac{h}{4}(3a+b)}{\frac{h}{4}(a+3b)}=\frac{3a+b}{a+3b}$$

So, the required ratio is (3a+b):(a+3b).
Hence, the correct option is (B).