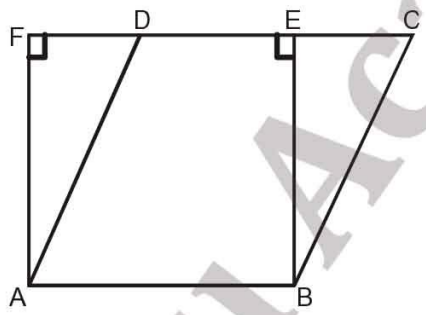
AREAS OF PARALLELOGRAMS AND TRIANGLES

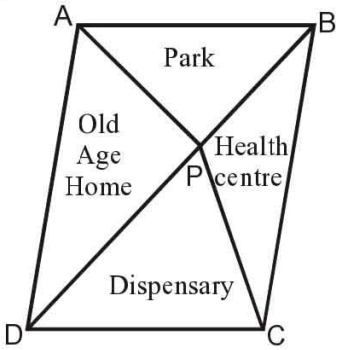
1. A craft mela is organised by Welfare Association to promote the art and culture of tribal people. The pandal is to be decorated by using string of bulbs all around the field. There are two options either to arrange it in a rectangular field ABEF or parallelogram ABCD with equal area.



   (a) What shape of the field should be chosen to minimise the expense of bulb and why ?

   (b) Which values are depicted here ?

2. A plot is in the form of a parallelogram ABCD. Owner of this plot wants to build OLD AGE HOME, DISPENSARY, PARK and HEALTH CENTRE for elderly people as shown in the fig. P is a point on the diagonal BD.



   (a) Prove that area alloted to old age home and dispensary is same.

   (b) Which values are depicted here ?

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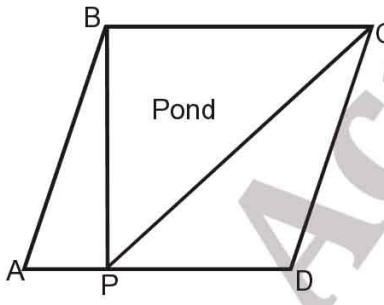
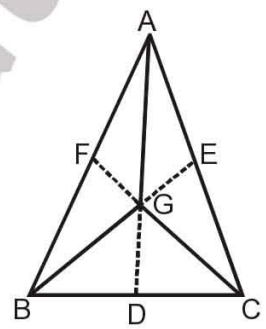
3. There was a deserted land near a colony where people used to throw garbage. Colony people united to develop a pond in triangular shape as shown in the fig. The land is in the shape of | |gm ABCD. In rest of the portion medicinal plants were grown. If area of parallelogram ABCD is 200 m^2.



(a) Calculate the area where medicinal plants were grown.

(b) Which value is depicted here ?

4. For 'Sarva Shiksha Abhiyan' a rally was organised by a school. Students were given triangular cardboard pieces to write slogans. They divided the triangular shape into three equal parts by drawing medians as shown in fig.



(a) Prove that area (AGC) = area (AGB)

= area (BGC)

$= \frac{1}{3}$ area (ABC)

(b) Which values are inculcated through this activity ?

[14]

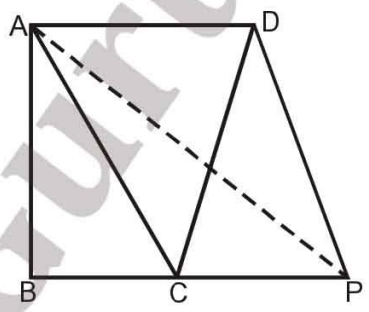
5. A farmer has a square plot of land where he wants to grow five different crops at a time. On half of the area in the middle he wants to grow wheat but in rest four equal triangular parts he wants to grow different crops.

   (a) Explain by diagram how he can divide the area to fulfill his purpose.

   (b) By using this crop pattern which values are depicted by the farmer?

6. There is a plot in a village in the shape of a quadrilateral ABCD. Sarpanch wants to get floor cemented so as to use it for social gatherings and panchayat meetings. Later due to construction of park in the neighbourhood for children they decided to change the shape to triangle ABP.

   If AC || DP



   (a) Prove that ar (quad. ABCD) = ar (Δ ABP)

   (b) What are the values depicted in this activity ?

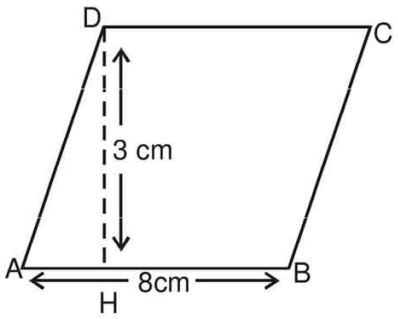
7. On National Integration day a poster is to be made by class IX students of a school. This poster is in the shape of a parallelogram. All religions should be given equal triangular space to display their teachings.

   (a) How will they divide a parallelogram into four triangles equal in area ? Justify it.

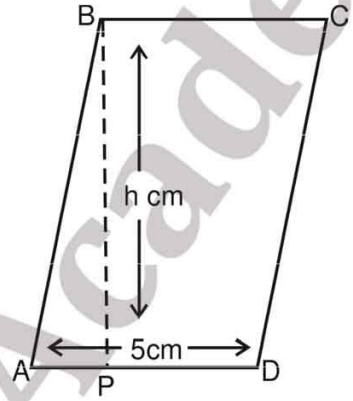
   (b) What are the values depicted here ?

8. In a class, teacher gave two identical carboard pieces which are in the shape of a parallelogram to two groups. First group was asked to find

area of parallelogram using AB as base. Then another group was asked to find height (h) of the parallelogram with AD as base.



Group (I)



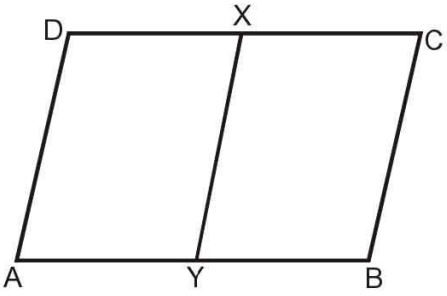
Group (II)

(a) How will they find value of h ?

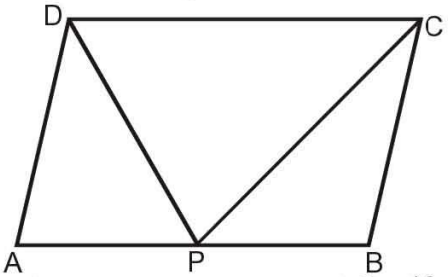
(b) What are the values involved here ?

9. In a class, teacher asks the students to cut a figure from a given parallelogram which has area equal to half the area of parallelogram ABCD.

Sunita joins the mid points of opposite sides of parallelogram as shown in the fig.



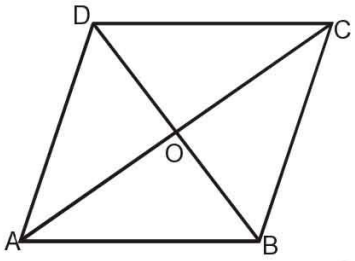
Where as Rohan draws a triangle on the same base as shown in fig.



(a) State whether two answers are correct. Justify.

(b) What values are depicted from this activity ?

10. In a rhombus ABCD, AC = 8 cm, then AO = 4 cm.



The statement shows

(a) Truth value (b) Social value

(c) Environment value (d) Cooperation

Justify your answer.

ANSWER

1. (a) Rectangle as

Perimeter of rectangle < Perimeter of parallelogram

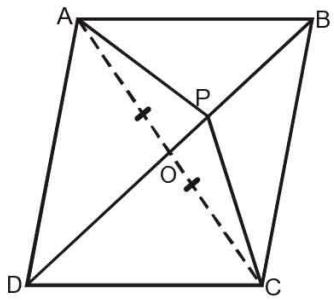
(b) Co-operation, helpfulness

2. (a) Join AC

Diagonals AC & BD of a | |gm ABCD bisect at O.

$\Rightarrow$ AO = OC and BO = OD

In ΔAPC, PO is median ($\because$ Median divides a triangle in two triangles equal in area)



$\therefore$ ar (APO) = ar (CPO) ..... (i)

In ΔADC,

DO is median

$\therefore$ ar (ADO) = ar(DCO) ..... (ii)

Adding (i) & (ii)

ar (APO) + ar (ADO) = ar (CPO) + ar (DCO)

$\Rightarrow$ ar (ADP) = ar (DPC)

(b) Helpfulness, happiness, cooperation

3. (a) 100 sq. cm.

   (b) Environmental protection, cooperation

4. (a) In Δ ABC, AD is median

   ∴ ar (ΔABD) = ar (ΔADC) _____ (i)

   also ar (ΔGBD) = ar (GDC) _____ (ii)

   subtracting (ii) from (i)

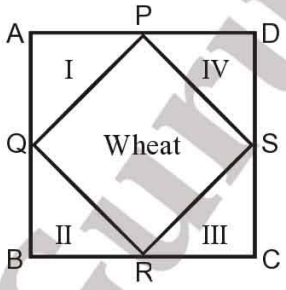
   ar (ΔAGB) = ar (ΔAGC)

   similarly

   ar (AGB) = ar (AGC) = ar (GBC)

   (b) Cooperation, sincerity

5. (a)



   joining midpoints of sides

   (b) Increases fertility of soil, environmental protection, happiness.

6. (a) Since AC || DP

   ar (ADC) = ar (APC) .....(i)

   (∵ triangles on the same base AC and between same parallels AC & DP are equal in area)

   Adding ar (ΔABC) to both sides of (i)

   ar (ADC) + ar (ABC) = ar (APC) + ar (ABC)

   ⇒ ar (ABCD) = ar (ABP)

   (b) Environmental protection, respecting others views

7. (a) Diagonals of a | | gm divides it into four triangles of equal area.
   (b) Unity of nation, co-operation, fraternity
8. (a) Area of | |gm ABCD

$$AB \times DH = AD \times BP$$

$$8 \times 3 = 5 \times h$$

$$\frac{8 \times 3}{5} = h$$

$$\frac{24}{5} = h$$

$$h = 4.8 \text{ cm.}$$

   (b) Scientific temper, cooperation
9. (a) Both are giving correct answer.
   (b) Scientific temper, curiosity, co-operation.
10. (a) Truth value