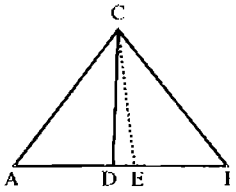
Exercise 16.2

(1) Show that a median of a triangle divides it into two triangles of equal area.



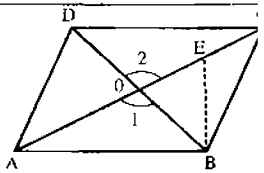
Given Median of the triangle

To Prove: Median divides the triangle into two triangles of equal area.

Proof Make ΔABC, with $\overline{CD}$ as median and $\overline{CE}$ as altitude

Statements	Reasons
$m\overline{AD} = m\overline{DB}$ .....(i)	D is midpoint of $m\overline{AB}$
Area of the $\Delta ACD = \frac{1}{2} . m\overline{AD}.m\overline{CE}$ ...(ii)	
Area of the $\Delta BCD = \frac{1}{2} . m\overline{BD}.m\overline{CE}$	
$= \frac{1}{2} . m\overline{AD}.m\overline{CE}$ ...(iii)	By (i)
$\Delta ACD = \Delta BCD$	By (ii) and (iii)

(2) Prove that a parallelogram is divided by its diagonals into four triangles of equal area.



Given

||gm divided by its diagonals into four triangles

To Prove

Areas of the four triangles arc equal

Construction Make the ||gm ABCD with diagonals $m\overline{AC}, m\overline{BD}$ intersecting each other a O. Draw $\overline{BE} \perp \overline{AC}$.

Proof

Statements	Reasons
Area of $\Delta OBC = \frac{1}{2} m\overline{OA}.m\overline{BE}$	
$= \frac{1}{2} m\overline{OC}.m\overline{BE}$ .....(i)	
The diagonals of the ||gm bisect each other	
$\therefore$ $m\overline{OA} \cong m\overline{OC}$	
In $\Delta OAB \leftrightarrow \Delta OCD$	
$m\overline{OB} \cong m\overline{OD}$	
$m\overline{OA} \cong m\overline{OC}$	
$<1 \cong <2$	opposite angles
$\Delta OAB \cong \Delta OCD$ ..... (ii)	
$\Delta OAD \cong \Delta OBC$ .....(iii)	
$\therefore$ Area ΔOAB = Area ΔOBC = Area ΔOCD = Area ΔODA	By (i), (ii) ,(iii)

(3) Which of the following are true and which are false?

(i) Area of a figure means region enclosed by bounding lines of closed figure. TRUE

(ii) Similar figures have same area. FALSE

(iii) Congruent figures have same area. TRUE

(iv) A diagonal of a parallelogram divides it into two non-congruent triangles. FALSE

(v) Altitude of a triangle means perpendicular from vertex to the opposite side (base). TRUE

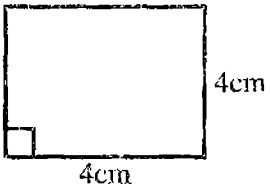
(vi) Area of a parallelogram is equal to the product of base and height. TRUE

Q.4 Find the area of the following.

(i)

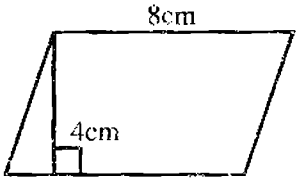
Area = $6 \times 3 = 18cm^2$

(ii)



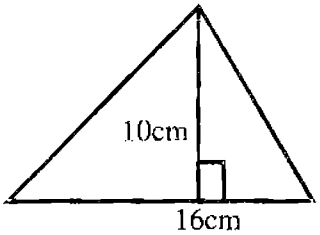
Area = $4 \times 4 = 16cm^2$

(iii)



Area = $8 \times 4 = 32cm^2$

(iv)



Area = $\frac{1}{2} \times 16 \times 10 = 80cm^2$