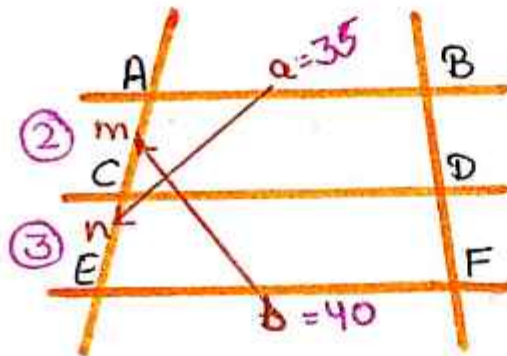


GEOMETRY

Q) In the figure given below $AB \parallel CD \parallel EF$, if side $AB = 35$ cm, side $EF = 40$ cm, $AC = \frac{2}{3} CE$ and side BD is x cm from side DF . If less then what will be the value of side CD ?

नीचे दिए गए चित्र में $AB \parallel CD \parallel EF$, यदि भुजा $AB = 35$ सेमी., भुजा $EF = 40$ सेमी., $AC = \frac{2}{3} CE$ और भुजा BD . भुजा DF से x सेमी. कम तो भुजा CD का मान क्या होगा?



$$CD = \frac{an + bm}{m + n}$$

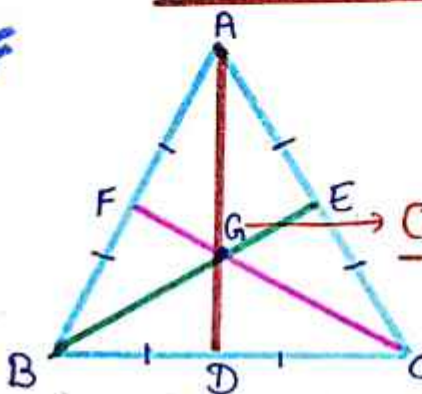
$$\frac{AC}{CE} = \frac{2}{3}$$

$$CD = \frac{80 + 105}{5} = \frac{185}{5} = 37 \text{ cm}$$

CENTROID / GRAVITY CENTRE (केन्द्रक)

:- MEDIAN माध्यिका :-

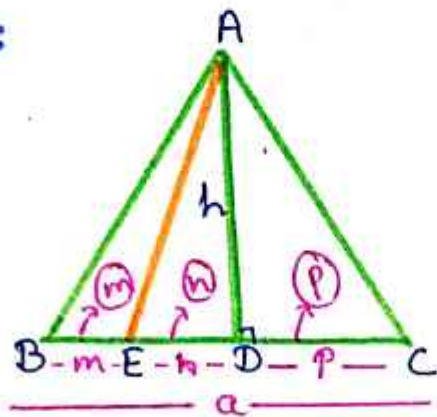
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Centroid (केन्द्रक) :- वह बिंदु जहाँ तीनों माध्यिका मिलती हैं उसे केन्द्रक कहते हैं।
A point where all three medians meet is called centroid.

$D = \text{mid point of } BC$
 $AD = \text{median}$
 $BE = \text{median}$
 $CF = \text{median}$

#



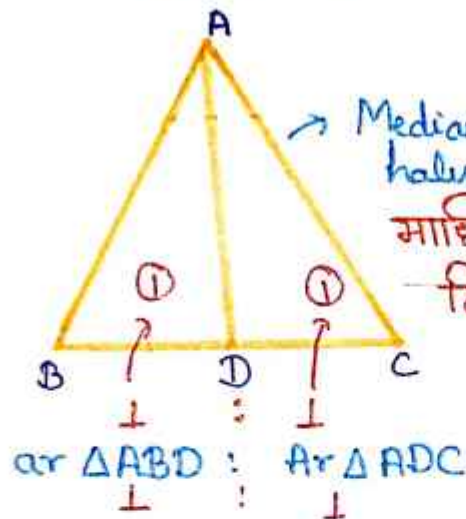
$$\text{ar } \triangle ABC = \frac{1}{2} \times a \times h$$

$$\text{ar } \triangle ABE : \text{ar } \triangle AED : \text{ar } \triangle ADC$$

$$\frac{1}{2} \times m \times h : \frac{1}{2} \times n \times h : \frac{1}{2} \times p \times h$$

$$m : n : p$$

#



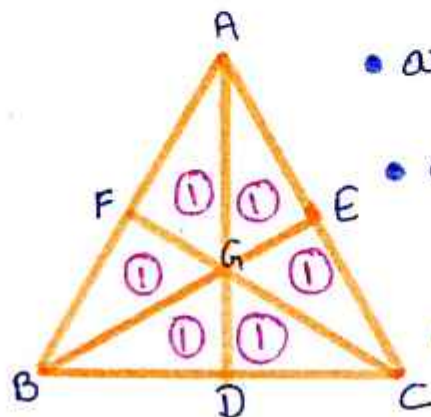
→ Median divides triangle in two equal halves.

माध्यिका त्रिभुज को दो बराबर हिस्सों में बाँटती है।

$$\text{ar } \triangle ABD : \text{ar } \triangle ADC$$

$$1 : 1$$

#



$$\text{ar } \triangle BGD : \text{ar } \triangle ABC$$

$$1 : 6$$

$$\text{ar } \triangle BGC : \text{ar } \triangle ABC$$

$$2 : 6$$

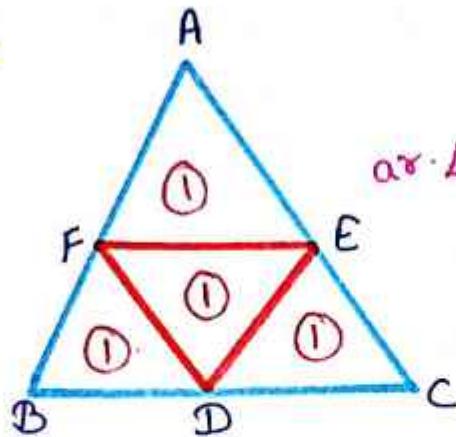
$$1 : 3$$

$$\text{ar } \square BFGD : \text{ar } \triangle ABC$$

$$2 : 6$$

$$1 : 3$$

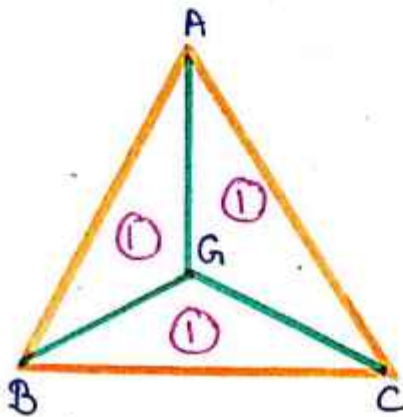
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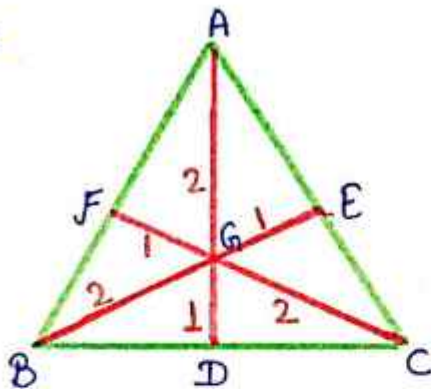
$$\text{ar } \triangle AFE = \text{ar } \triangle FBD = \text{ar } \triangle FDE = \text{ar } \triangle FDC$$

• D, E, F $\rightarrow$ mid points

#

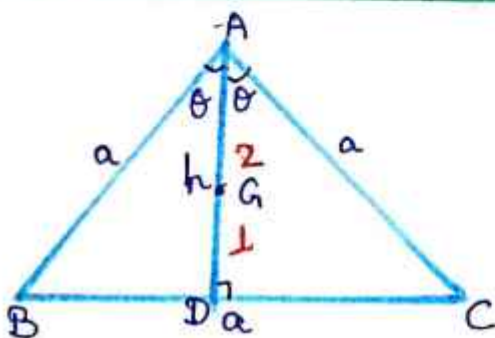


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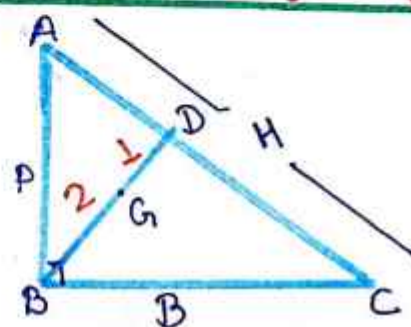


• Centroid divides the median into 2:1
(केन्द्रक माध्यिका को 2:1 में बाँटता है।)

समबाहु त्रिभुज Equilateral Δ



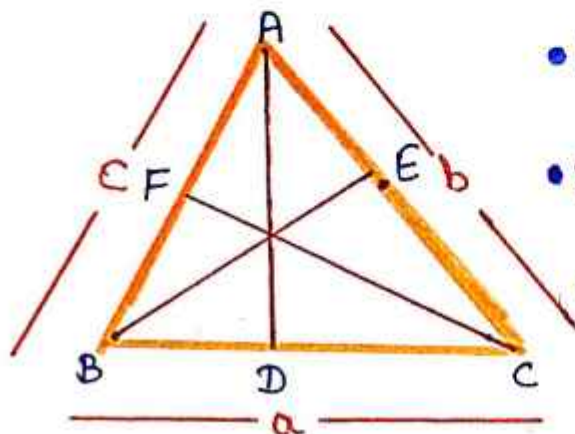
समकोण त्रिभुज Right angle triangle



AD = height, median, angle bisector
 $h = \frac{\sqrt{3}}{2}a$

BD = माध्यिका = $\frac{\text{कर्ण}}{2} = \frac{H}{2}$

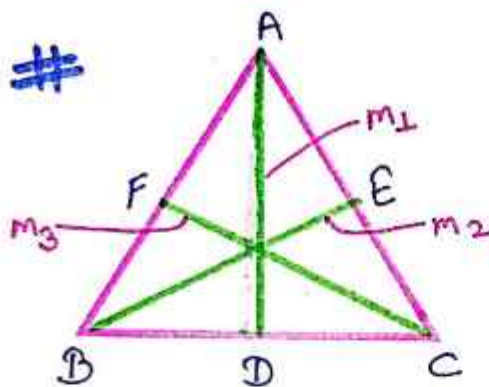
LENGTH OF MEDIAN माध्यिका की लम्बाई



• $AD = \frac{1}{2}\sqrt{2b^2 + 2c^2 - a^2}$

• $BE = \frac{1}{2}\sqrt{2c^2 + 2a^2 - b^2}$

• $CF = \frac{1}{2}\sqrt{2b^2 + 2a^2 - c^2}$



- Area of triangle when all three medians are given.
 (त्रिभुज का क्षेत्रफल जब तीनों माध्यिका दी गई हों)

Area = $\frac{4}{3}$ [तीनों माध्यिका द्वारा बने त्रिभुज का Area]

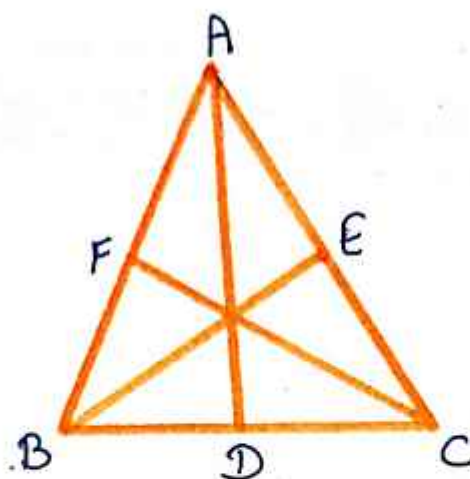
Ex:- तीनों माध्यिका $\left\{ \begin{matrix} m_1 = 9 \\ m_2 = 12 \\ m_3 = 15 \end{matrix} \right\}$ Right angle Δ

त्रिभुज का क्षेत्रफल = ?

$\frac{4}{3} \left[\frac{1}{2} \times 9 \times 12 \right]$

72

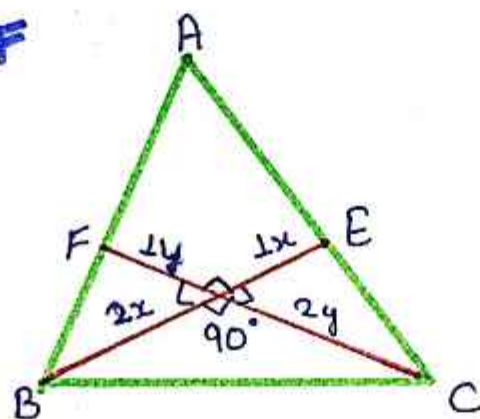
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$$AB + BC + CA > AD + BE + CF$$

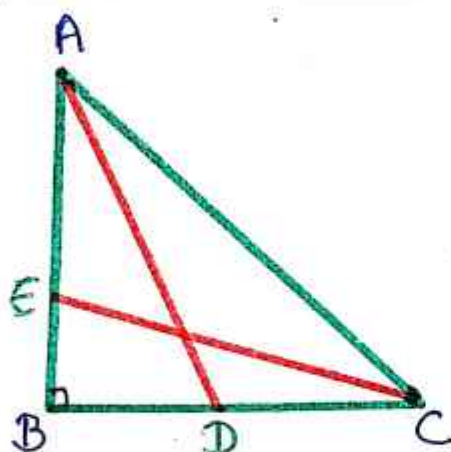
$$3(AB^2 + BC^2 + CA^2) = 4(AD^2 + BE^2 + CF^2)$$

#



$$AB^2 + AC^2 = 5BC^2$$

#

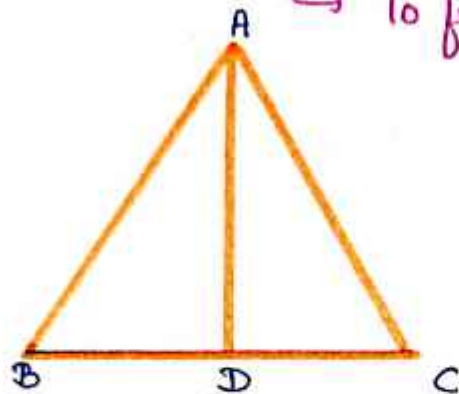


• $CE \& AD \rightarrow$ Medians

$$AD^2 + CE^2 = \frac{5}{4} AC^2$$

APOLLONEOUS THEOREM

↳ To find length of median



AD = median

$$AB^2 + AC^2 = 2(AD^2 + BD^2)$$