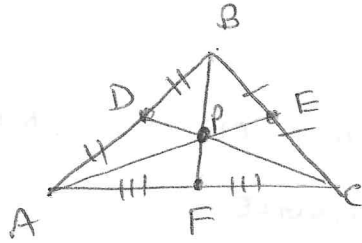


# 5.4 MEDIANS AND ALTITUDES

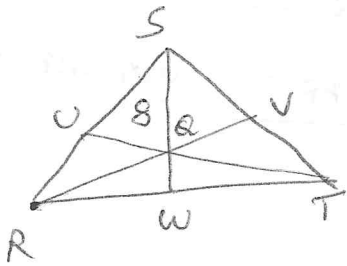
1) MEDIAN:- IT IS A SEGMENT FROM A VERTEX TO THE MID-POINT OF THE OPPOSITE SIDE. THE THREE MEDIANS OF A TRIANGLE ARE CONCURRENT. THE POINT OF CONCURRENCY, IS CALLED THE CENTROID IS INSIDE THE TRIANGLE.



2)

$$\begin{aligned}
 P &= \text{Median} \\
 AP &= \frac{2}{3} AE, & AP:PE &= 2:1 \\
 BP &= \frac{2}{3} BF, & \text{or} & \\
 CP &= \frac{2}{3} CD, & \frac{AP}{PE} &= \frac{2}{1}
 \end{aligned}$$

EX:



IN  $\Delta RST$ , Q IS THE CENTROID AND  $SQ = 8$

FIND QW AND SW:

Sol:-  $SQ = \frac{2}{3} SW$

$$8 = \frac{2}{3} SW$$

$$\frac{3 \cdot 8}{2} = \frac{2}{2} SW \cdot \frac{2}{2}$$

$$\boxed{12 = SW}$$

$$QW = SW - SQ = 12 - 8 = 4$$

$$\boxed{QW = 4}$$

OR

$$SQ:QW = 2:1$$

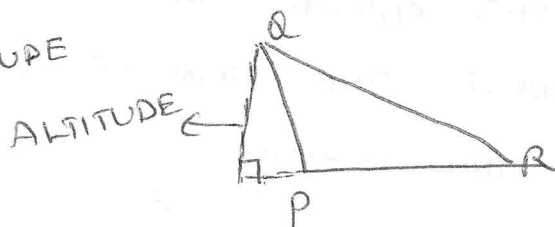
$$\frac{SQ}{QW} = \frac{2}{1}$$

$$\frac{8}{QW} = \frac{2}{1}$$

$$\frac{2QW}{2} = \frac{8}{2}$$

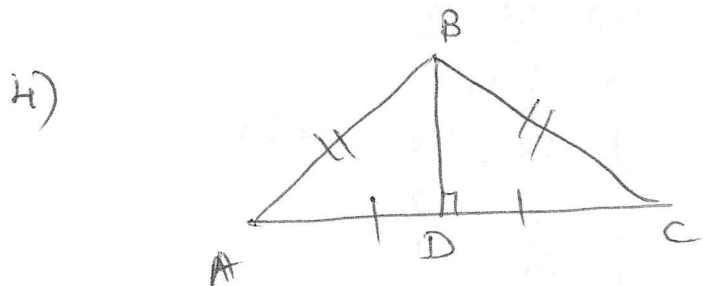
$$\boxed{QW = 4}$$

II) ALTITUDE:- AN ALTITUDE OF A TRIANGLE IS THE PERPENDICULAR SEGMENT FROM A VERTEX TO THE OPPOSITE SIDE OR TO THE LINE THAT CONTAINS THE OPPOSITE SIDE.



2) THE POINT OF CONCURRENCY OF A TRIANGLE IS CALLED ORTHOCENTER OF THE TRIANGLE:

- 3) IN ACUTE TRIANGLE  $\rightarrow$  ORTHOCENTER IS INSIDE THE TRIANGLE  
 IN RIGHT TRIANGLE  $\rightarrow$  ORTHOCENTER IS ON THE TRIANGLE.  
 IN OBTUSE TRIANGLE  $\rightarrow$  ORTHOCENTER IS OUTSIDE THE TRIANGLE



IF  $AB = BC$ ,

THEN  $BD$  IS THE MEDIAN TO BASE AC

AND

$BD$  IS ALSO AN ALTITUDE TO BASE AC.