What You Will Learn

- Use medians and find the centroids of triangles.

Circumcenter: - equidistant to each Vertex of △
- Point of Concurrence (How it is created)
⊥ bisectors
- Can be in, on, or outside △

Incenter: - Always inside △
- equidistant to each side of △
- Point of Concurrence (How it is made)
Angle bisectors.

Using the Median of a Triangle

A **median of a triangle** is a segment from a vertex to the midpoint of the opposite side. The three medians of a triangle are concurrent. The point of concurrency, called the **centroid**, is inside the triangle.

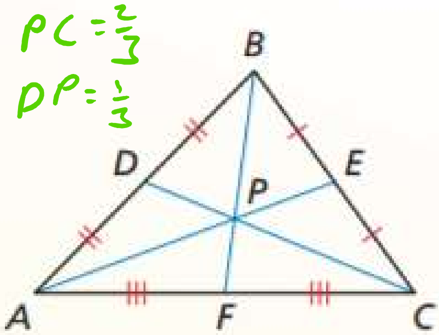
Theorem 6.7 Centroid Theorem

The centroid of a triangle is two-thirds of the distance from each vertex to the midpoint of the opposite side.

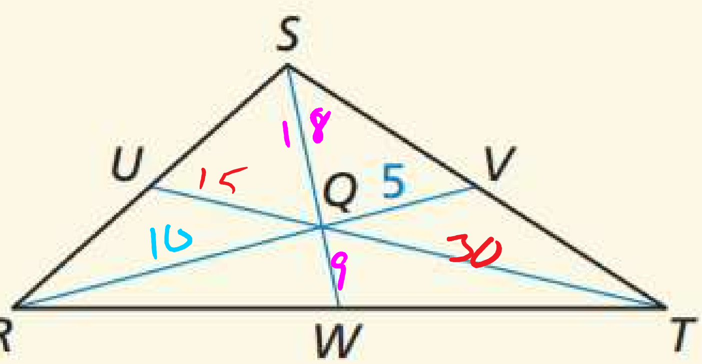
The medians of $\triangle ABC$ meet at point P, and $AP = \frac{2}{3}AE$, $BP = \frac{2}{3}BF$, and $CP = \frac{2}{3}CD$.

Proof *BigIdeasMath.com*

$DC = 1$
$PC = \frac{2}{3}$
$DP = \frac{1}{3}$



In $\triangle RST$, point Q is the centroid, and $VQ = 5$. Find RQ and RV.



5 is $\frac{1}{3}$ of VR

$\frac{3}{1} \cdot 5 = \cancel{\frac{1}{3}} \cdot x \cdot \cancel{\frac{3}{1}}$

$\underline{15 = x}$

$VR = 15$

$SQ = 18$

$QW = 9$

$SW = 27$

18 is $\frac{2}{3}$ of x

$\frac{3}{2} \cdot 18 = \frac{2}{3} \cdot x \cdot \frac{3}{2}$

$27 = x$

$UT = 45$

$UQ = 15$

$QT = 30$

$x = \frac{1}{3} \cdot 45$

$x = 15$

Find the coordinates of the centroid of $\triangle ABC$ with vertices $A(0, 4)$, $B(-4, -2)$, and $C(7, 1)$.

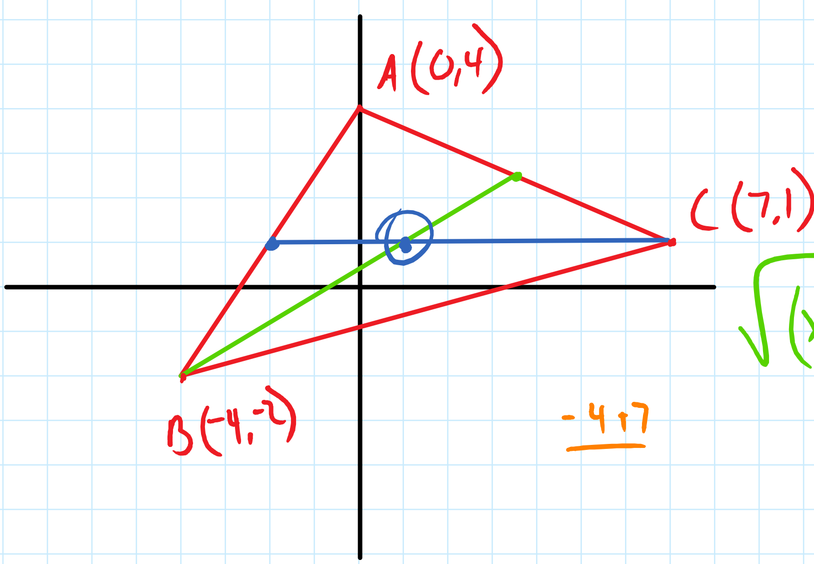
$\left(\frac{0+{}^-4}{2}, \frac{4+{}^-2}{2}\right)$

$\left(\frac{-4}{2}, \frac{2}{2}\right) = (-2, 1)$

$\left(\frac{0+7}{2}, \frac{4+1}{2}\right)$

$\left(\frac{7}{2}, \frac{5}{2}\right)$

$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$



$\underline{-4+7}$

Centroid $\triangle ABC = (1,1)$

Practice sec 6.3 pg.
324: 2-18A
Pg. 328: 9,10