

Medians and Altitudes of Triangles

Learning Target: To construct and define the medians of triangles and to apply the Centroid Theorem.

1.) Median of a triangle construction:

$AE = 7.5 \text{ cm}$

$AO = 5 \text{ cm}$

$5 = \frac{2}{3}(7.5)$

$5 = 5 \checkmark$

Centroid Theorem

$AO = \frac{2}{3}(AE)$

$BO = \frac{2}{3}(BF)$

$CO = \frac{2}{3}(CO)$

$AO = 2(OE)$

Median of a triangle definition:

A segment connecting the vertex of a triangle to the midpoint on the opposite side.

2.) Now draw two other medians from the other vertices above.

Centroid: A point where all medians intersect where each median is cut into two parts/segments.

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

Examples:

a.)

Find LJ if $JK = 6$

$LJ = 3$

b.)

Find x if $TP = 2x + 1$ and $TQ = 3x - 5$

$$\begin{array}{r}
 3x - 5 = 2x + 1 \\
 -2x \quad -2x \\
 \hline
 x - 5 = 1 \\
 +5 \quad +5 \\
 \hline
 x = 6
 \end{array}$$

c.)

Find CG if $KG = 41.4$

$CG = \frac{2}{3}(41.4)$

$CG = 27.6$

$KG = 41.4$

$CG = 27.6$

$KG = 13.8$

d.)

$3x + 6$

$2x + 8$

$2x - 1$

$$BH = \frac{2}{3} (BF)$$



$$3x + 6 = \frac{2}{3} (3x + 6 + 2x - 1)$$

$$3(3x + 6) = \frac{2}{3} (5x + 5) \cdot \cancel{3}$$

$$\begin{array}{r|l} \cancel{3}x + 18 = 10x + 10 & \\ -\cancel{3}x & -\cancel{3}x \\ \hline 18 = x + 10 & \\ -10 & -10 \\ \hline & \end{array}$$

$$\boxed{x = 8}$$