Lesson 6.3 Medians of Triangles

Sunday, January 21, 2024 5:01 PM

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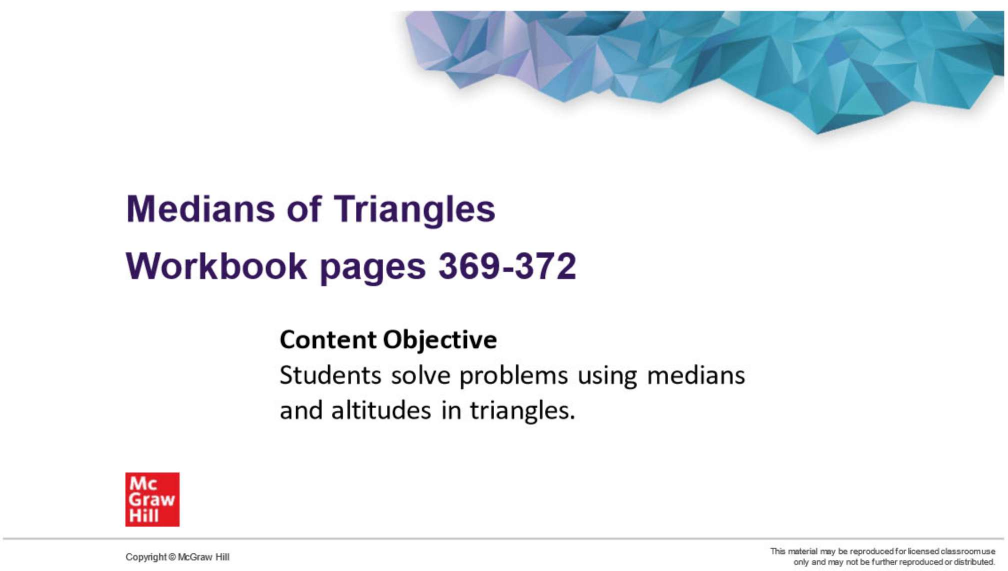
Lesson 6.3 Medians



Florida’s B.E.S.T. Standards for Mathematics

MA.912.GR.1.3 Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.

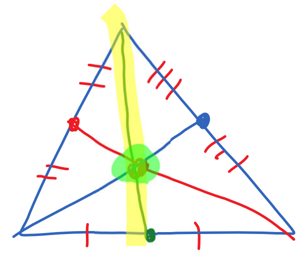
MA.912.GR.3.3 Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.

Learn

Medians of Triangles

In a triangle, a **median** is a line segment with endpoints that are a vertex of the triangle and the midpoint of the side opposite the vertex.

Every triangle has three medians that are concurrent. The point of concurrency of the medians of a triangle is called the **centroid**, and it is always inside the triangle.



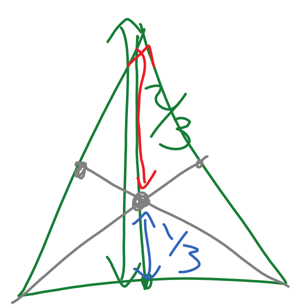
Learn

Medians of Triangles

Theorem 6.7: **Centroid Theorem**

The medians of a triangle intersect at a point called the centroid that is two-thirds of the distance from each vertex to the midpoint of the opposite side.

All polygons have a balancing point or *center of gravity*. This is the point at which the weight of a region is evenly dispersed and all sides of the region are balanced. The centroid is the center of gravity for a triangular region.

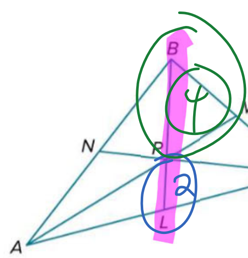


Example 1

Use the Centroid Theorem

In △*ABC*, *P* is the centroid and *BL* = 6. Find *BP* and *PL*.

$\frac{2}{3} \cdot \frac{6}{1} = \frac{12}{3} = 4$



6

$\frac{1}{3} \cdot \frac{6}{1} = \frac{6}{3} = 2$

Students, draw anywhere on this slide!
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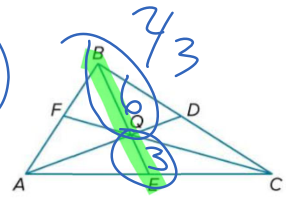
Example 1
Use the Centroid Theorem

Check

In $\triangle ABC$, Q is the centroid and $BE = 9$. Find BQ and QE.



$$\frac{2}{3}\cdot\frac{9}{1}=\frac{18}{3}=6$$

$$\frac{1}{3}\cdot 9=3$$

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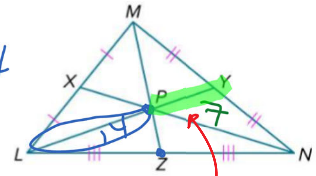
Example 2
Apply the Centroid Theorem

In △LMN, $PY = 7$. Find LP.



$2 \times 7 = 14$

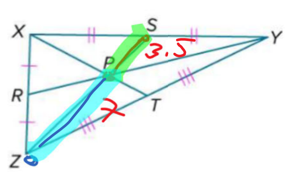
$\frac{1}{3} \cdot \frac{21}{1} = \frac{21}{3} = 7$

$\frac{2}{3} \cdot \frac{21}{1} = \frac{42}{3} = 14$

Example 2
Apply the Centroid Theorem

Check

In △XYZ, $SP = 3.5$. Find PZ.



$3.5 \times 2 = 7$

Apply Example 3

Find a Centroid on the Coordinate Plane

CHIMES **Lashaya needs to hang a wind chime with a single piece of cord. The pipes of the wind chime are attached to a triangular platform. When the platform is placed on a coordinate plane, the vertices of the triangle are located at (-4, 2), (3, -1), and (4, 5). What are the coordinates of the point where the cord should be attached to the platform so the wind chime stays balanced?**

$(0, 3.5)$ $\frac{-4+4}{2}$ $\frac{2+5}{2}$

A **The vertices of the triangle are located at (-4, 2), (3, -1), and (4, 5).** B C
What are the coordinates of the point where the cord should be attached to the platform so the wind chime stays balanced?

$\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}$

$\frac{-4+3}{2}$ $\frac{2+-1}{2}$

$(-0.5, 0.5)$