Lesson 6.3 Medians and Altitudes *Points of Concurrency

Wednesday, February 2, 2022 7:50 PM

https://app.peardeck.com/student/tcytwanjh

gem
lesson 6.3

Date: 2/3/22

Lesson 6.3 - Medians and Altitudes of Triangles

Learning Intent (Target): <u>*Today I will*</u> be able to use the properties of the points of concurrency to solve problems involving medians & altitudes of triangles.

Success Criteria: <u>*I'll know I'll have it when*</u> I can accuratley use medians and altitudes to determine the distance and location of the points of concurrency.

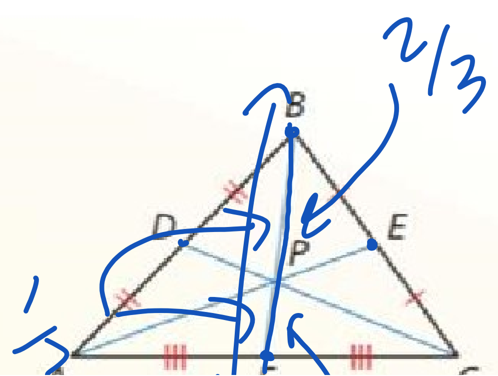
Accountable Team Task: <u>*Therefore, I can*</u> practice using interactive Pear Deck Powerpoint for notes and geogebra investigations.

Theorem

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 $CP = \frac{2}{3}CD$.



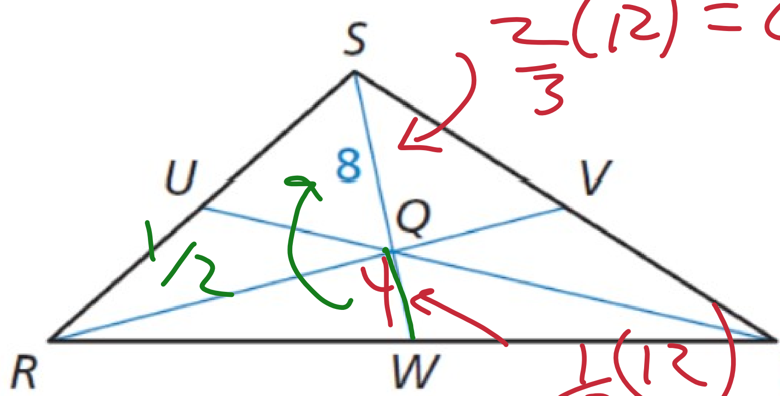
Proof BigIdeasMath.com (center of gravity) $1/3$

Students, draw anywhere on this slide!

In $\triangle RST$, point Q is the centroid, and $SQ = 8$. Find QW and SW.

4 12

$\frac{2}{3}(12) = 8$

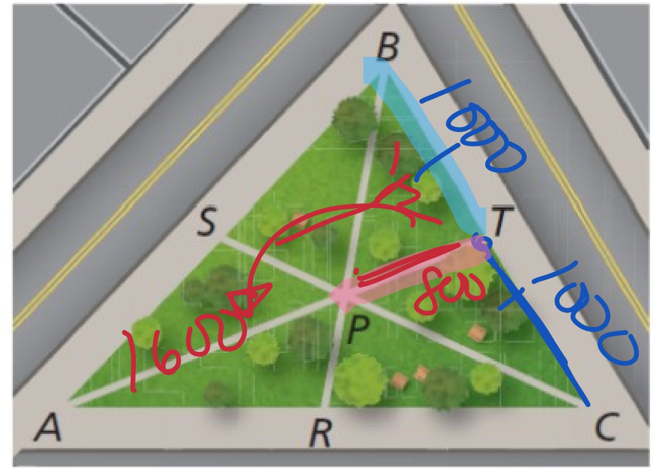


$\frac{1}{3}(12) = 4$

Students, draw anywhere on this slide!

There are three paths through a triangular park. Each path goes from the midpoint of one edge to the opposite corner. The paths meet at point *P*.

– medians
centroid



1. Find PS and PC when $SC = 2100$ feet.

$\frac{1}{3}(2100)$ (700) $\frac{2}{3}(2100) = (1400)$

2. Find TC and BC when $BT = 1000$ feet.

1000 2000

3. Find PA and TA when $PT = 800$ feet.

1600 2400

Find the coordinates of the centroid of the triangle with the given vertices.

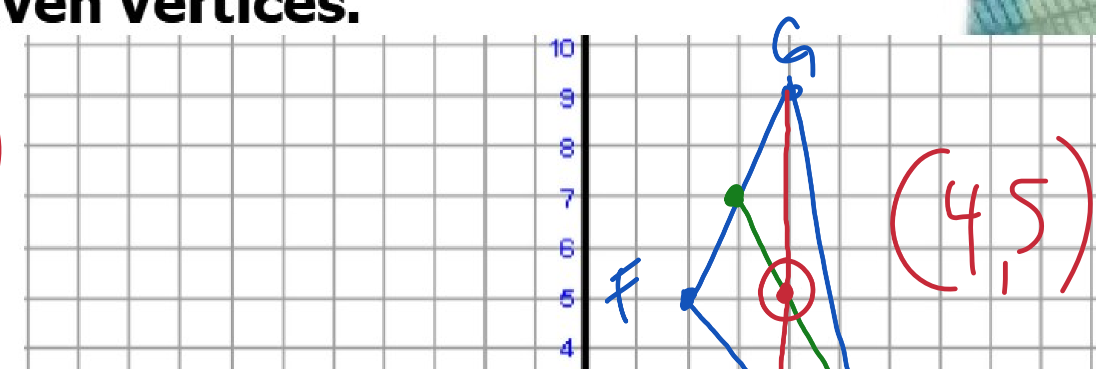
4. $F(2, 5)$, $G(4, 9)$, $H(6, 1)$

Midpoint

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

$2+4$ $5+9$

$\frac{2+6}{2}, \frac{5+1}{2}$



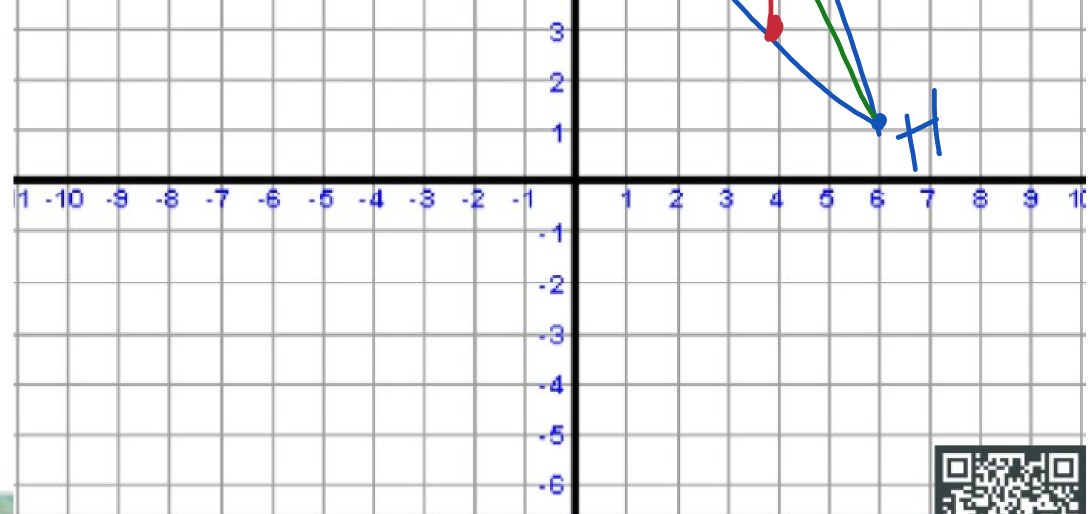
(4, 5)

$\frac{6}{2}$ $\frac{14}{2}$

$3, 7$

$\frac{8}{2}$ $\frac{6}{2}$

$(4, 3)$



Find the coordinates of the centroid of the triangle with the given vertices.

5. $X(-3, 3)$, $Y(1, 5)$, $Z(-1, -2)$

$x_1\ y_1$ $\quad x_2\ y_2$

Midpoint

$-3+1 \qquad 3+5$

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

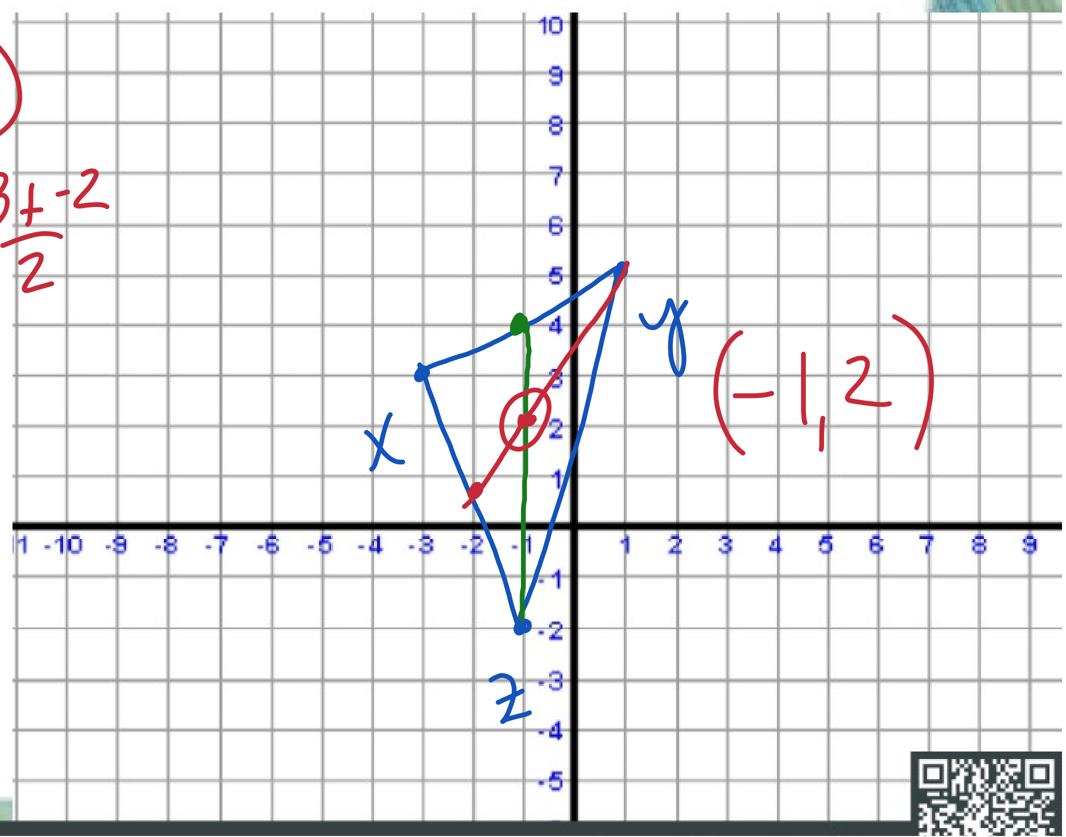
$\frac{-2}{2}, \frac{8}{2}$

$(-1, 4)$

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

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

$(-2, 0.5)$



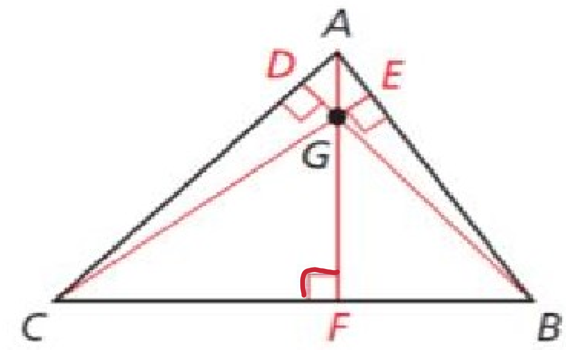
Core Concept

Orthocenter

height

The lines containing the altitudes of a triangle are concurrent. This point of concurrency is the **orthocenter** of the triangle.

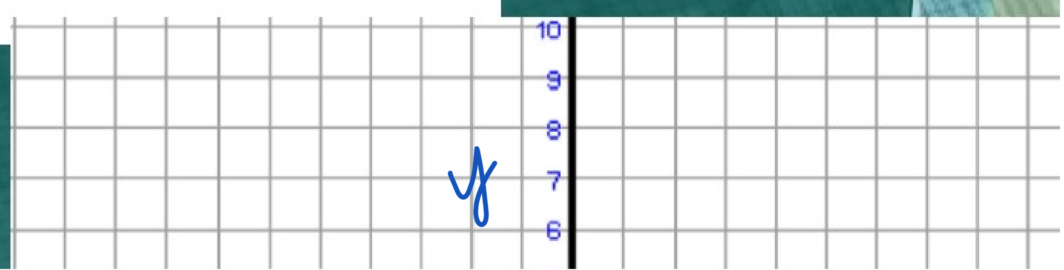
The lines containing $\overline{AF}$, $\overline{BD}$, and $\overline{CE}$ meet at the orthocenter G of $\triangle ABC$.



Find the coordinates of the orthocenter of $\triangle XYZ$ with vertices $X(-5, -1)$, $Y(-2, 4)$, and $Z(3, -1)$.

Slope $\overline{YZ} = -1$

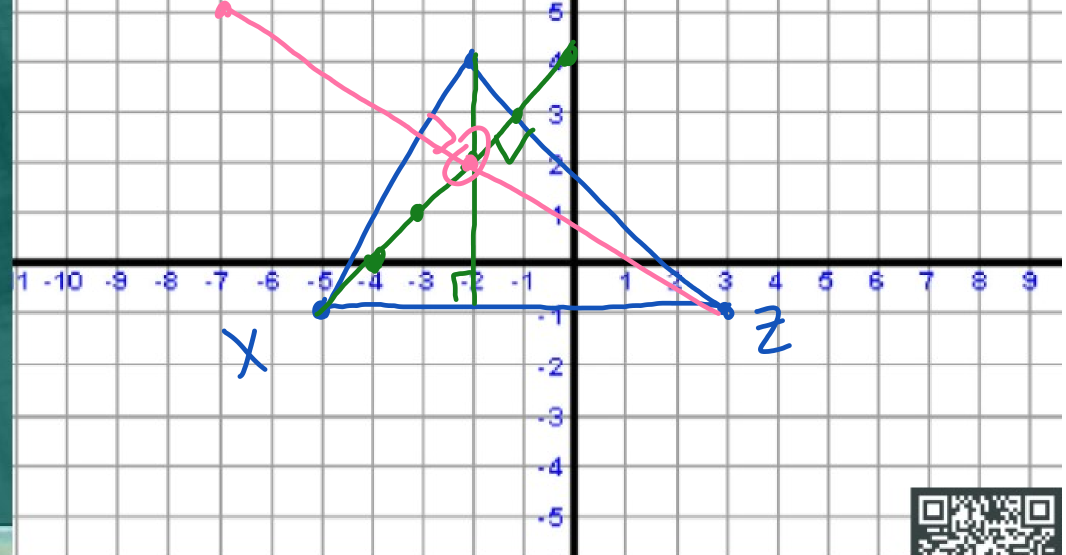
new slope $= 1$



Slope of $XY = \frac{5}{3}$

new slope $= -\frac{3}{5}$

$(-2, 2)$

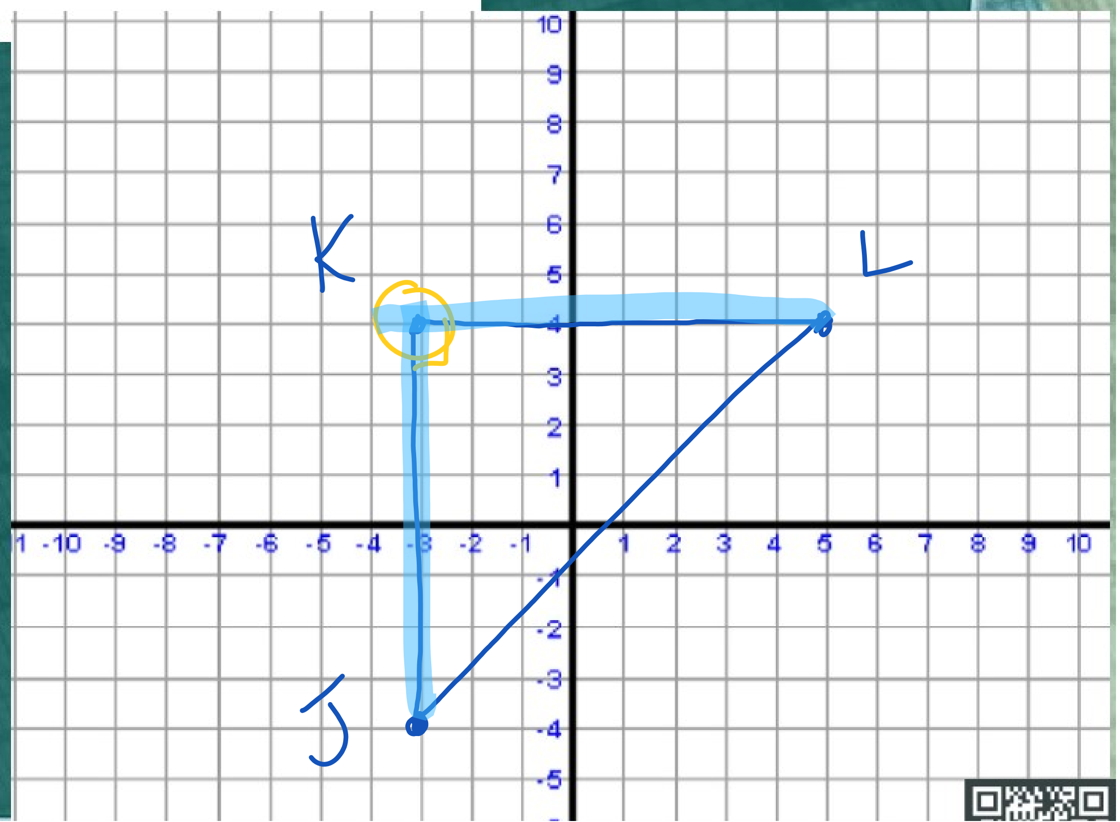


Tell whether the orthocenter of the triangle with the given vertices is *inside*, *on*, or *outside* the triangle. Then find the coordinates of the orthocenter.

7. $J(-3, -4)$, $K(-3, 4)$, $L(5, 4)$

Right Triangle
on the Right ∠

$(-3, 4)$

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