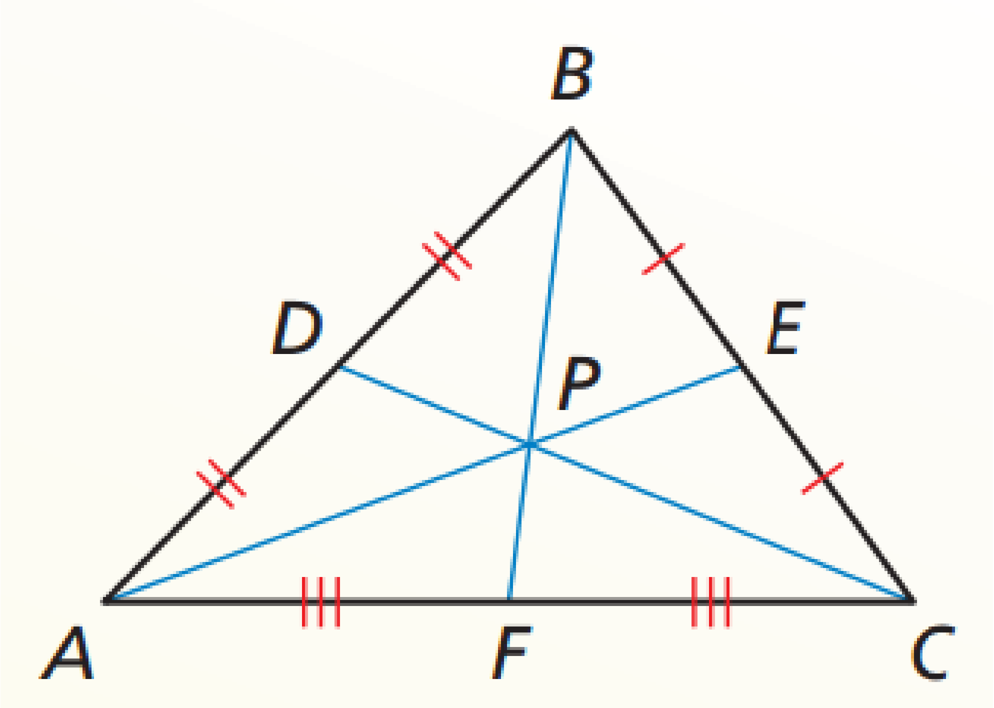
Medians and Altitudes of Triangles

Lesson 6.3

Medians of a Triangle and Centroid Theorem	Altitudes of a Triangle and Orthocenter Theorem
Centroid Examples	Orthocenter Examples

Median of a Triangle

The 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.

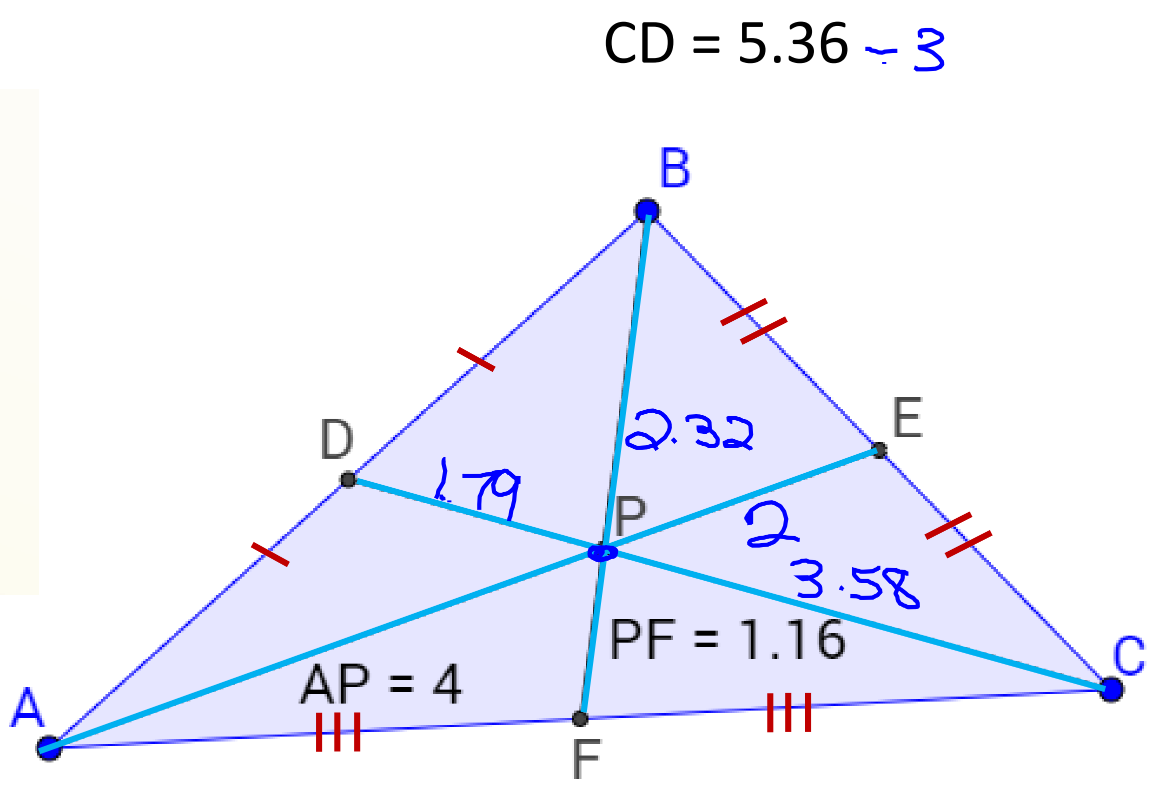


Centroid Theorem

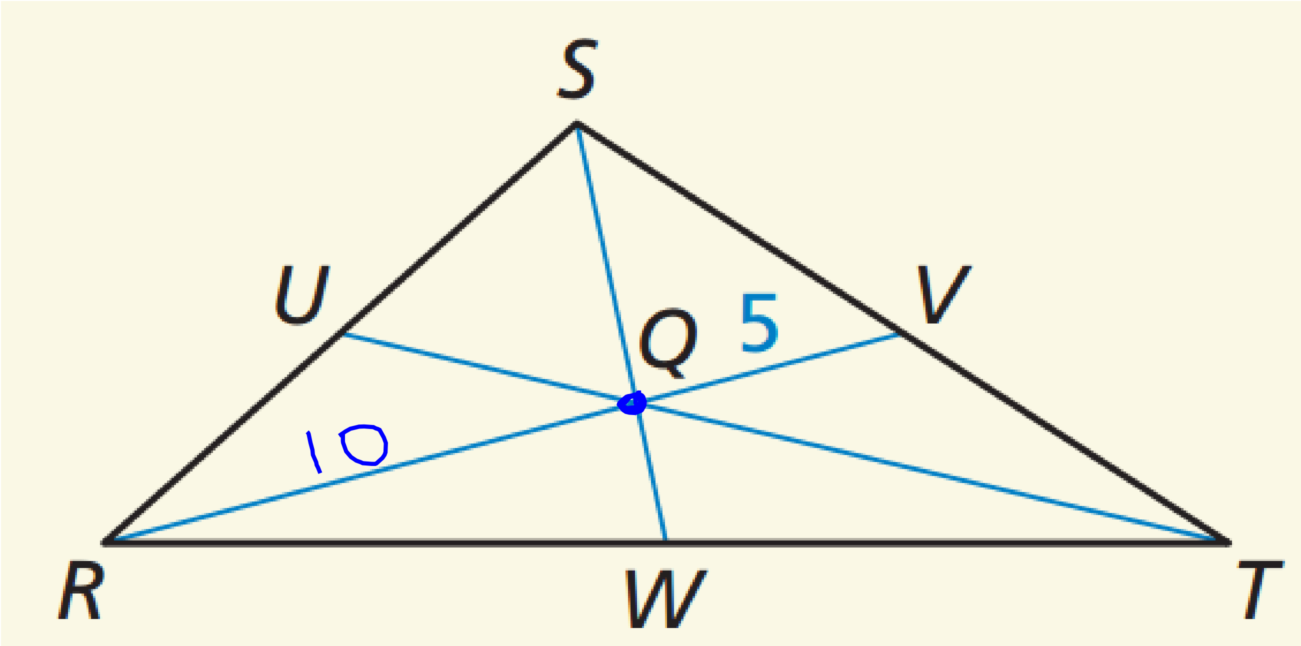
The centroid of a triangle is two-thirds of the distance from each vertex to the midpoint of the opposite side.

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

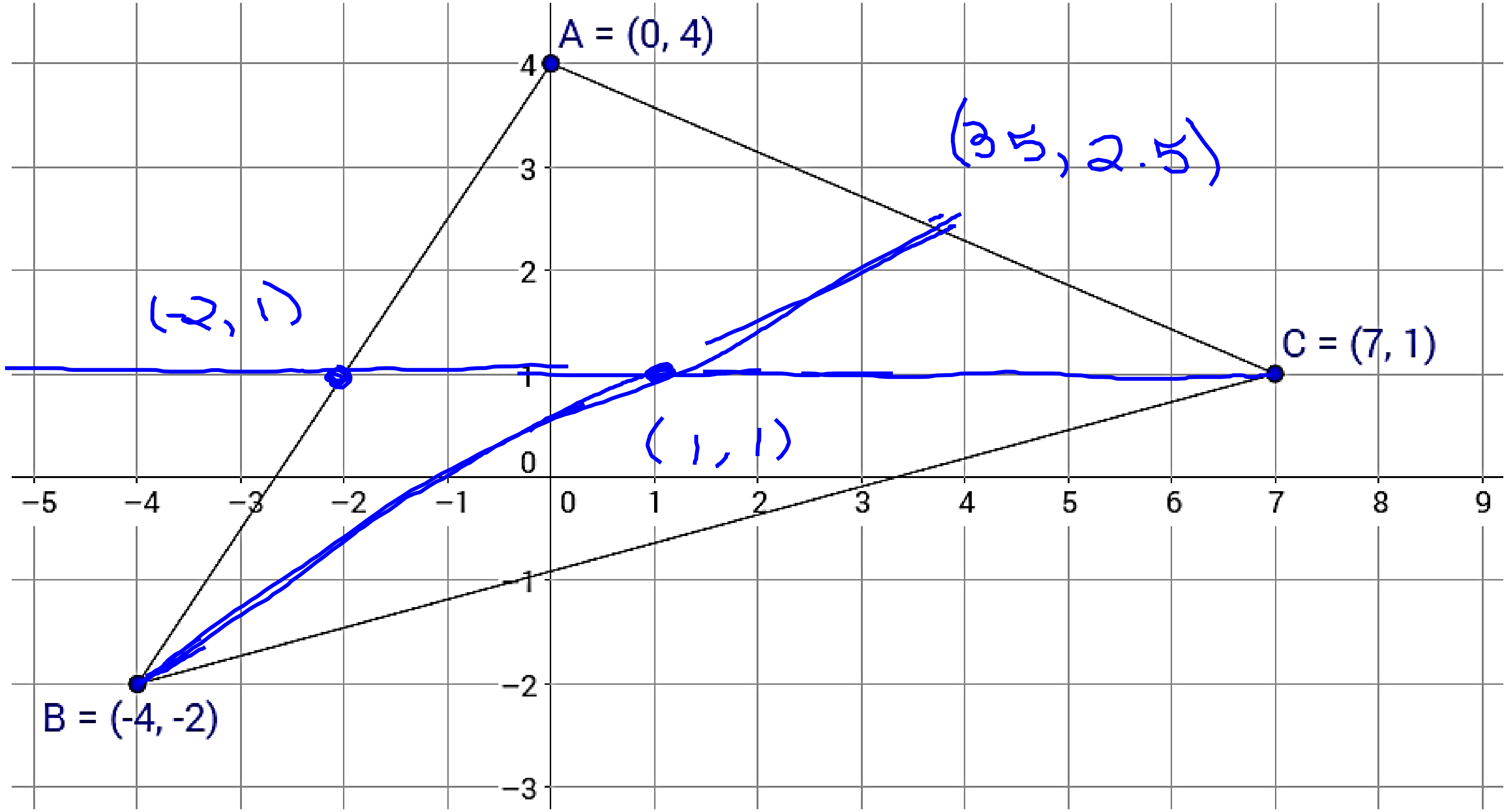
Short segment → long ×2
long segment → short ÷2
whole median → short ÷ 3
Short segment → whole median ×3



In ΔRST, point Q is the centroid, and VQ = 5. Find RQ and RV. = 15

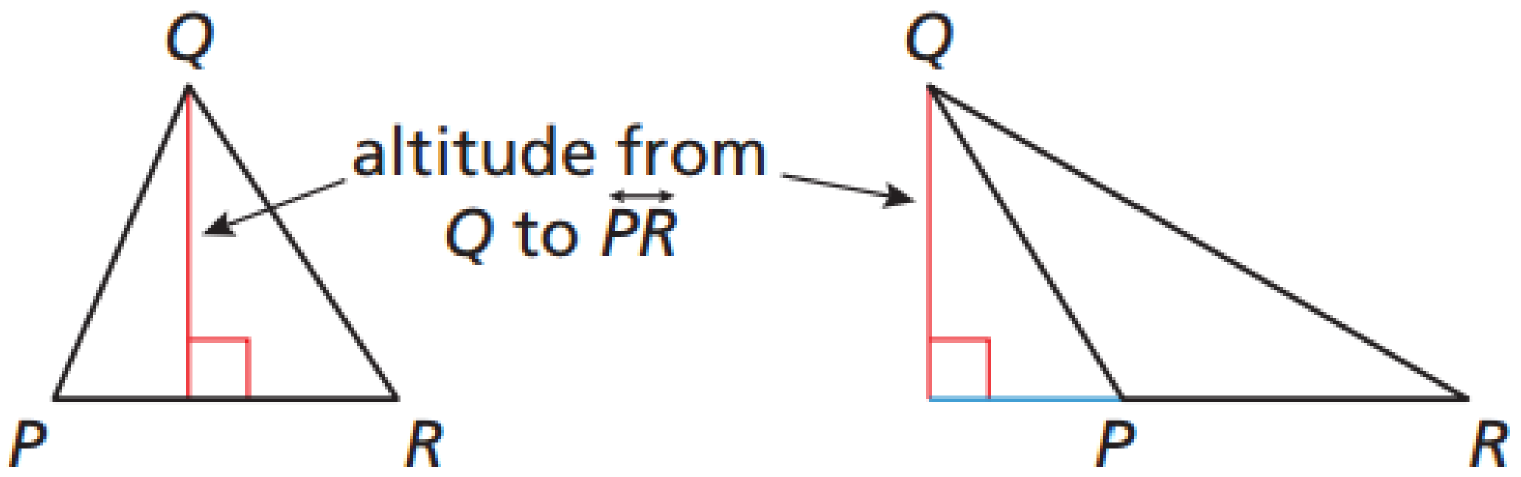


Find the coordinates of the centroid of ΔABC with vertices A(0, 4), B(−4, −2), and C(7, 1).



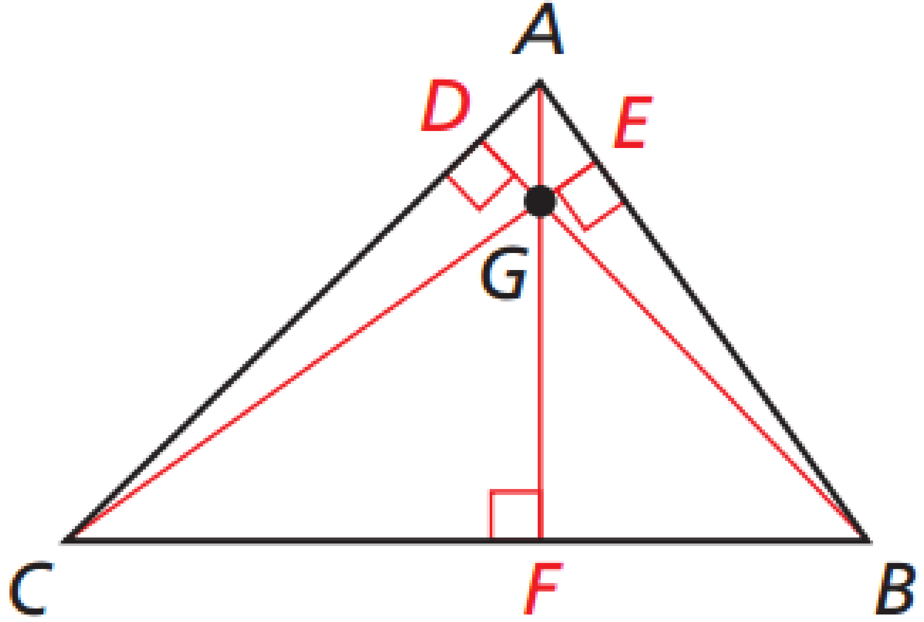
Altitude of a Triangle

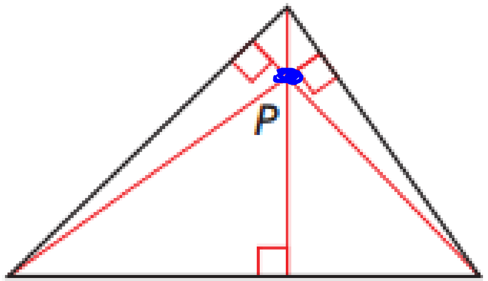
An altitude of a triangle is the perpendicular segment from a vertex to the opposite side or to the line that contains the opposite side.



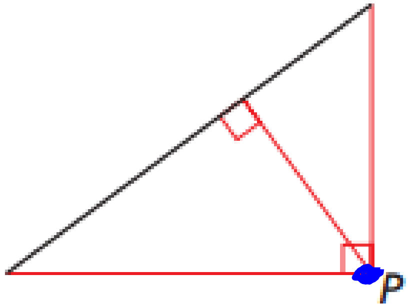
Orthocenter

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 △ABC.

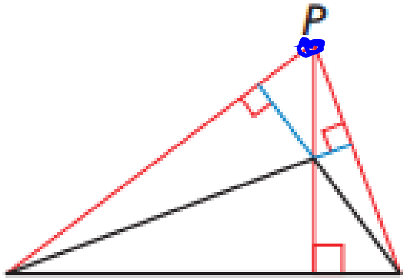




Acute triangle
P is inside triangle.

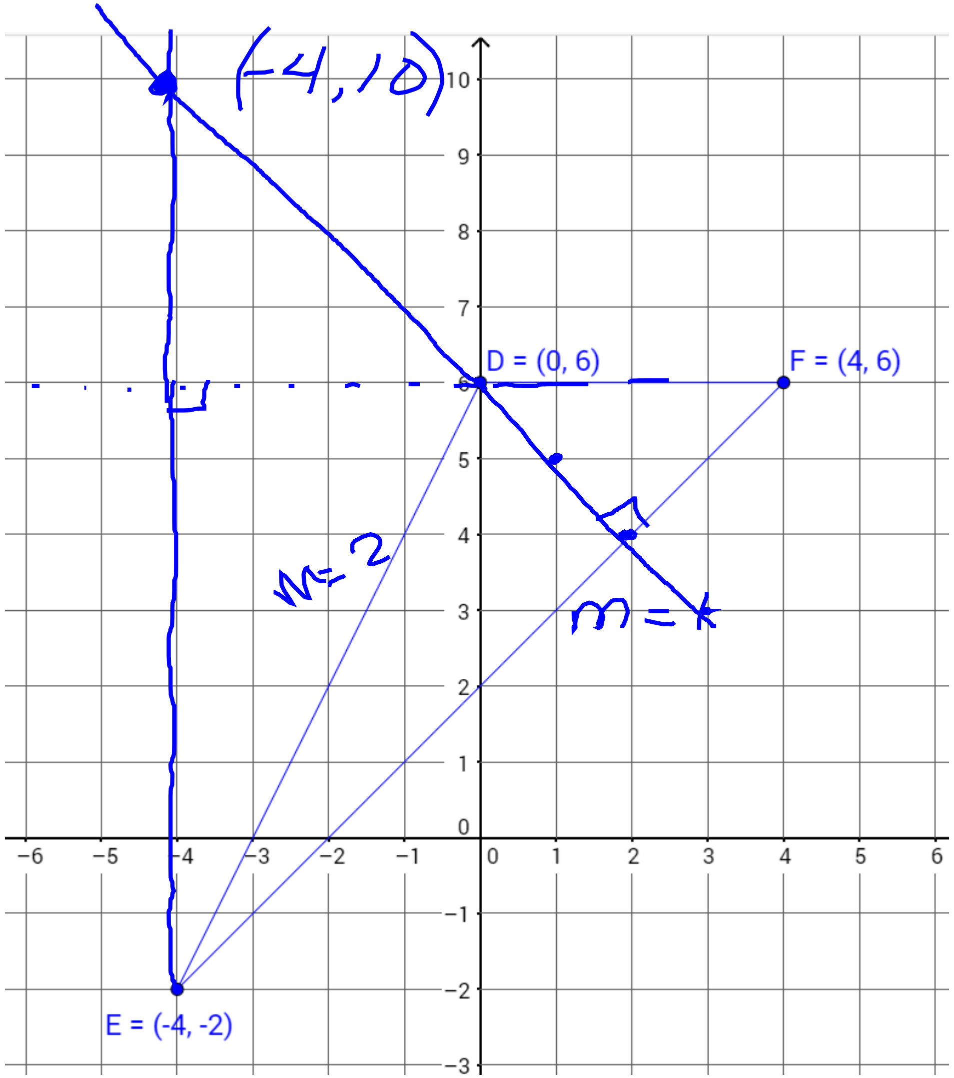


Right triangle
P is on triangle.



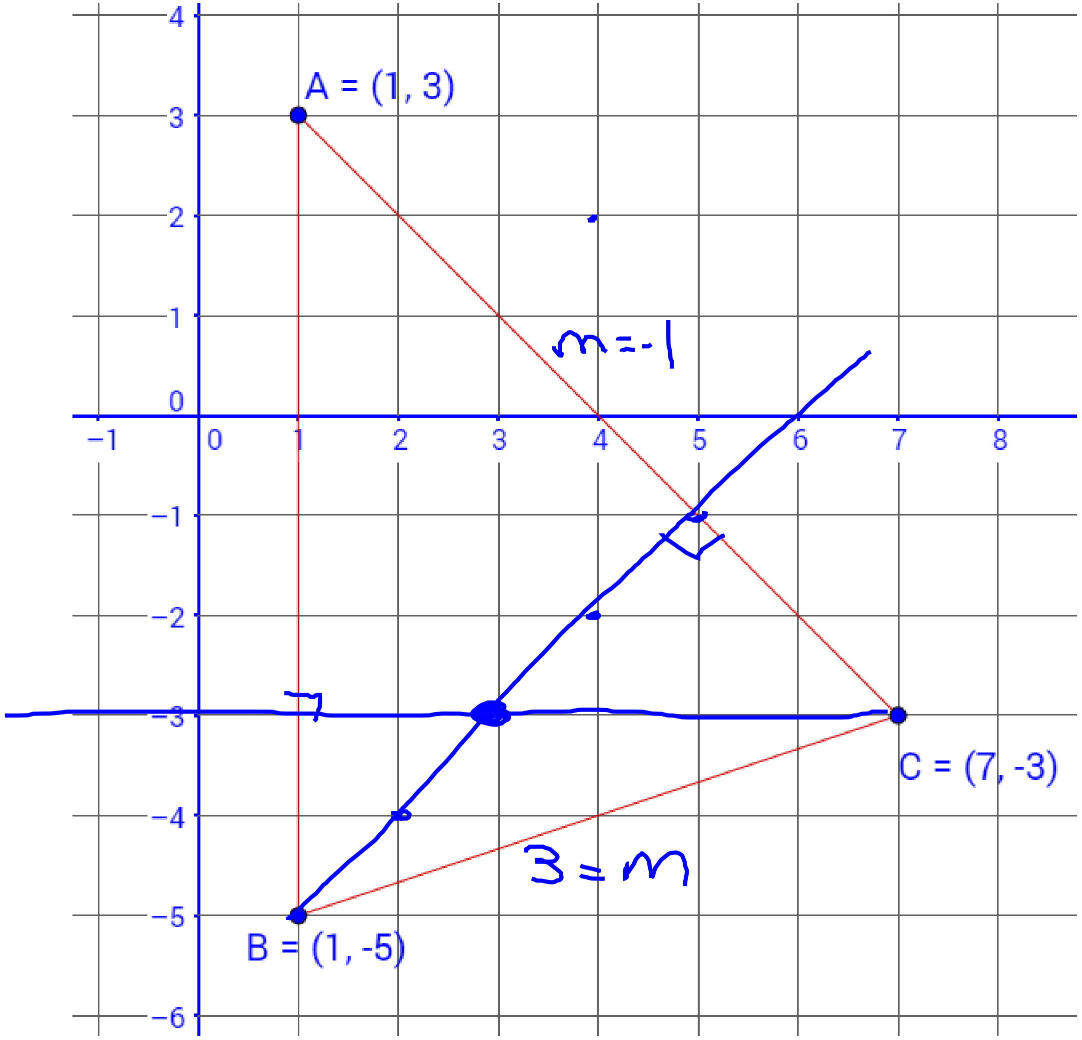
Obtuse triangle
P is outside triangle.

Find the coordinates of the orthocenter of △DEF with vertices D(0, 6), E(−4, −2), and F(4, 6).



Find the coordinates of the orthocenter for ΔABC with vertices A(1, 3), B(1, –5), and C(7, –3).

(3, -3)



Lesson 6.3 p 324; 1, 2, 6-22 even, 32-36 even, 48, 55-58.

Skip 18 – do 17 instead