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Chapter 3: Constructions
Topic 6: Centroid Day 1

Construction #11: Centroid - All three MEDIANS

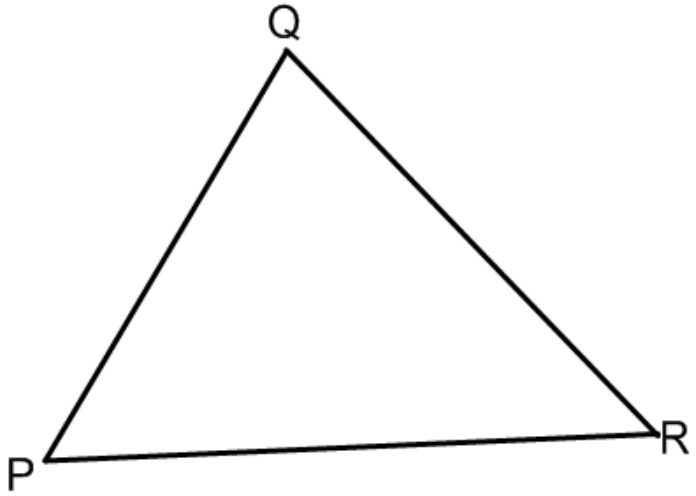
Recall: A _____ of a triangle is drawn from the vertex of a triangle to the _____ of the opposite side. A _____ creates two congruent line segments.

The three _____ of a triangle are concurrent at a point called the _____.

Some _____ facts:

1.) The _____ is the "_____"

2.) The _____ is ***always*** found _____ the triangle.



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The Coordinates of the Centroid:

Given three vertices of a triangle: (x_1,y_1), (x_2,y_2), and (x_3,y_3), the coordinates of the centroid are the

_____ of all of those points. Therefore, the coordinates of the centroid can be

found by this rule: _____.

This helps to explain why the centroid is the center of gravity of a triangle.

Examples:

1) Given ΔABC with coordinates A(0,0), B(4,0), and C(2,6), show that the medians of ΔABC intersect at (2,2).

2) ΔABC has vertices A(-3,3), B(2,5), and C(4,-3). What are the coordinates of the centroid of ΔABC?

3) Given ΔPQR with vertices P(3,4), Q(2,8), and R(10,0). What are the coordinates of the centroid of ΔPQR?

4) Given ΔJKL with vertices J(3x,2y), K(0,4y), and L(6x,0). What are the coordinates of the centroid of ΔJKL?

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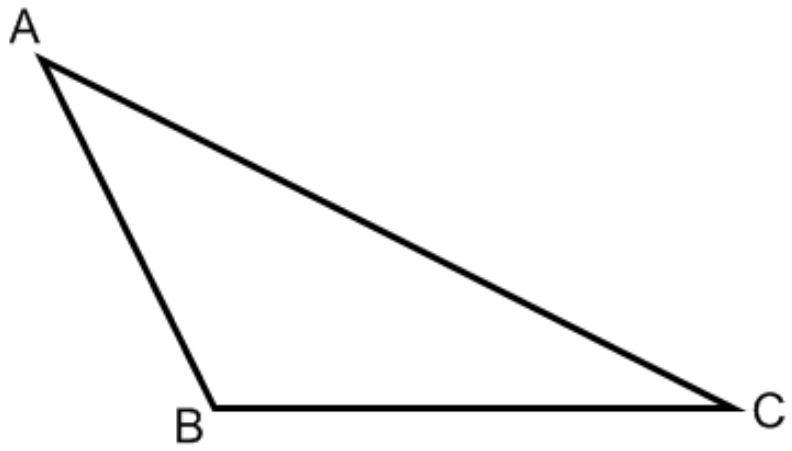
Solve each of the examples completely. Show steps to your solution. For any construction, show all construction marks.

1.) Construct the centroid of ΔABC.



2.) Given the coordinates of a triangle, determine the coordinates of the centroid of each triangle:

a.) D(0, 0), E(3, 15), and F(12,0)

b.) G(-2, 0), H(-4, -3), I(-12, -6)

c.) E(x, 2y), F(3x, 5y), G(4x, 2y)

d.) T(4,5), U(6, 1), V(8,9)

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Review:

3. In ΔKLC, $\overline{KF}$ is an angle bisector. If $m\angle LKF = 4x + 3$ and $m\angle CKF = 6x - 15$, find $\angle CKL$

   Sketch & Label Justify Work

4. In triangle ABC, $\overline{CK}$ is the median to $\overline{AB}$, and the length of $\overline{AK}$ is $8y + 50$ and $\overline{KB}$ is $4y + 114$, find the length of $\overline{AB}$.

   Sketch & Label Justify Work

5. In ΔACT, $\overline{CO}$ is a perpendicular bisector. If $\overline{AO} = 4x + 8$ and $\overline{TO} = 2x + 24$, and $m\angle AOC = 2z + 16$, find x & z.

   Sketch & Label Justify Work

6. In ΔXYZ, $\overline{YW}$ is an altitude. If $m\angle XYW = x + 10$ and $m\angle WXY = 6x - 4$, find x.

   Sketch & Label Justify Work