Name:__________________________ **Date:_____________**

Geometry Notes CG - 9: Using the Formulas

<u>Summary of Formulas</u>

1. Distance:

   Answer:

2. Slope:

   Answer:

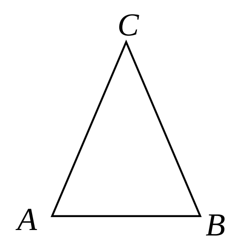
3. Midpoint:

   Answer:

<u>Four Important Problems</u>

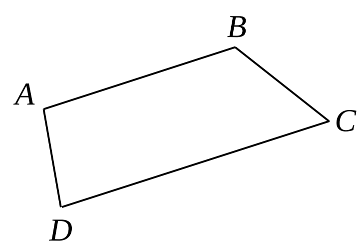
1. Congruent:

   To show line segments congruent:



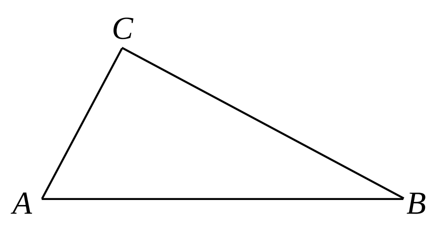
2. Parallel:

   To show two line segments parallel:



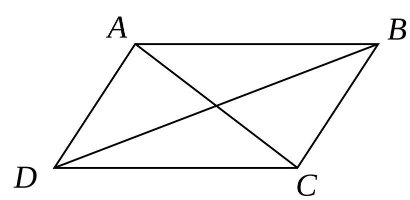
3. Perpendicular:

   To show two line segments perpendicular:

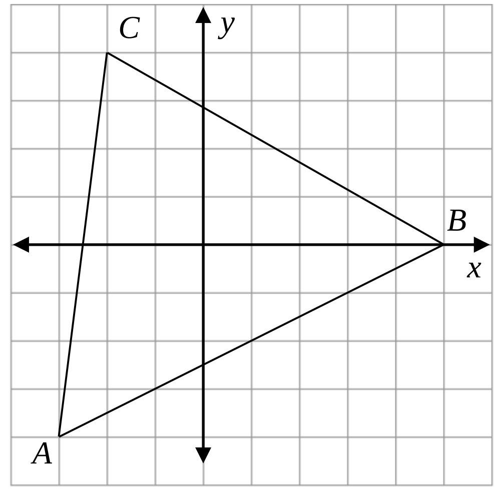


4. Bisect each other:

   To show two segments bisect each other:



Ex: ΔABC has vertices $A(-3, -4)$, $B(5, 0)$ and $C(-2, 4)$.



a. Show that ΔABC is isosceles.

b. Find the coordinates of D on $\overline{AB}$ such that $\overline{CD}$ is a median of ΔABC.

c. Show that $\overline{CD}$ is an altitude of ΔABC

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Geometry HW: CG - 9

Show work.

1. Quadrilateral *ABCD* has vertices *A*(–1, –1), *B*(2, 1), *C*(6, –2) and *D*(3, –4). Determine using coordinate geometry whether or not the diagonals* of *ABCD*

   a. bisect each other.

   b. are congruent.

   c. are perpendicular.

   Show work and give a reason for each of your answers.

   **Diagonals* in a quadrilateral connect *opposite* vertices (angles). The diagonals of *ABCD* are $\overline{AC}$ and $\overline{BD}$. You need to know this.

2. Triangle *ABC* has vertices *A*(–1, –2), *B*(3, 6), and *C*(11, 2). Show using coordinate geometry that ΔABC is an isosceles right triangle. (Note: there are *two* parts to this problem, *isosceles* and *right*.)

3. Given the points $X(0, 3b)$, $Y(a, 0)$, and $Z(a + 6b, 2a)$;

   a. Find the length of $\overline{YZ}$.

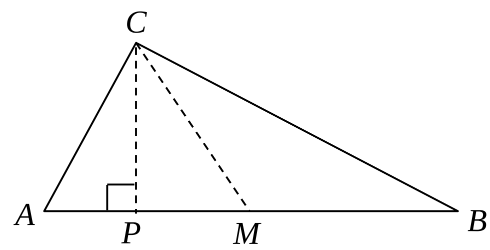
   b. Find the midpoint of $\overline{YZ}$.

   c. Show that $\overline{XY} \perp \overline{YZ}$.

You must know these definitions:

A *median* of a triangle is a line segment that goes from one vertex of the triangle to the **midpoint** of the opposite side. In the figure, M is the midpoint of $\overline{AB}$, so $\overline{CM}$ is a median of ΔABC.

An *altitude* of a triangle is a line segment that starts from one vertex and is **perpendicular** to the opposite side (or to the line that contains that side). In the figure, $\overline{CP} \perp \overline{AB}$ so $\overline{CP}$ is an altitude of ΔABC.



3. The vertices of ΔRST are $R(11, -1)$, $S(13, 10)$, and $T(3, 5)$.

   a. Find the length of the median from S to $\overline{RT}$.

   b. Show that the median from S to $\overline{RT}$ is also an altitude of the triangle.

   c. Find the area of ΔRST.