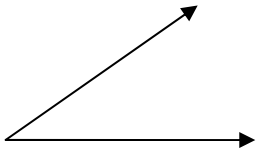
BASIC CONTRUCTION

Last Name: _____ First Name: _____ Period: _____ Date:____/____/_____

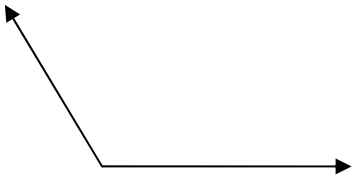
Be sure to leave all markings as a proof of your work!!!

1. Copy the segment shown below on the right

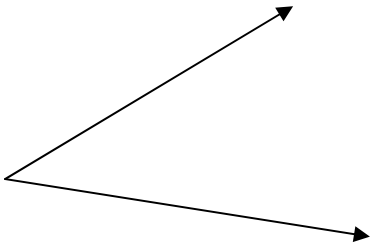
2. Copy the acute angle shown below on the right



3. Copy the obtuse angle shown below on the right



4. Bisect the angle below



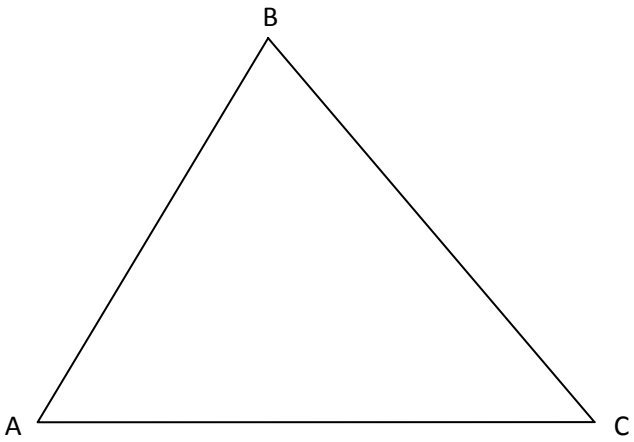
5. Find the perpendicular bisector of the segment below

CONTRUCTION: Triangle

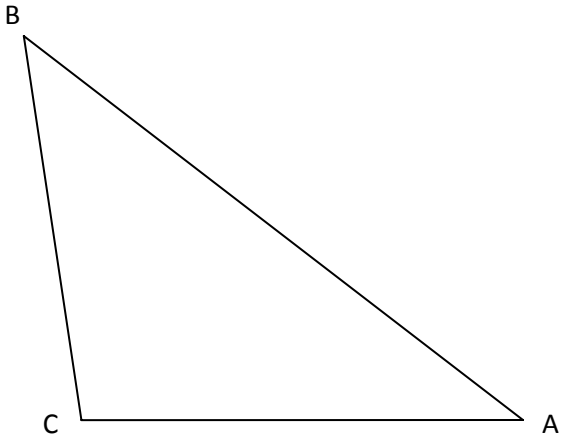
Last Name:_____ First Name: _____ Period _____ Date:____/____/_____

Be sure to leave all markings as a proof of your work!!!

1. Construct the angle bisector of $\angle B$.

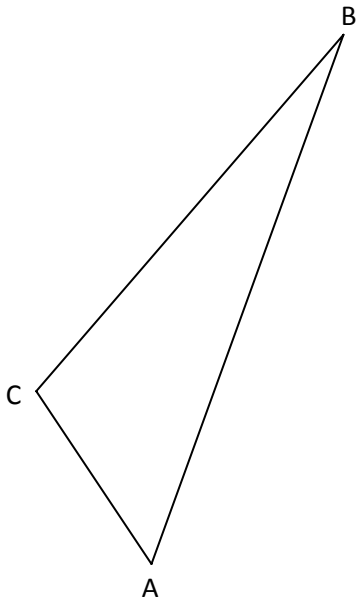


2. Construct the median of $\overline{AB}$.

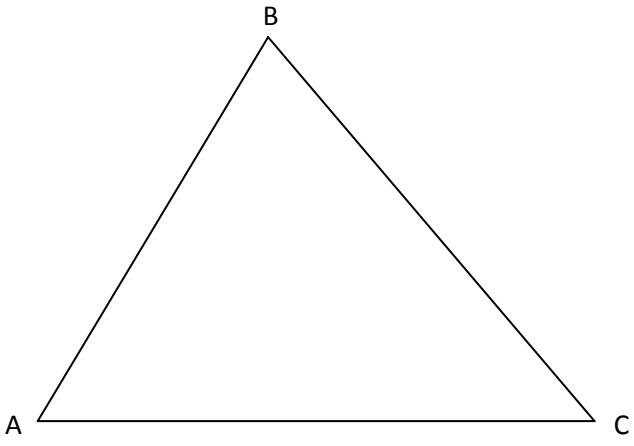


Be sure to leave all markings as a proof of your work!!!

3. Construct the perpendicular bisector of $\overline{AB}$.



4. Construct the 3 altitudes of ΔABC.



CONTRUCTION: Centers of Triangle

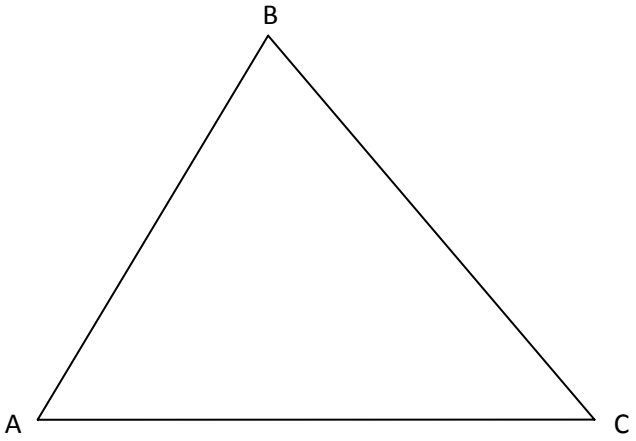
Last Name:_____ First Name: _____ Period _____ Date:____/____/_____

Be sure to leave all markings as a proof of your work!!!

1. **Perpendicular bisector of a triangle:** Segment that passes through the midpoint of, and is perpendicular to the side of a triangle. Draw all perpendicular bisectors on the triangle given.

   Check the appropriate name of the intersection: ☐ incenter; ☐ circumcenter; ☐ orthocenter; ☐ centroid

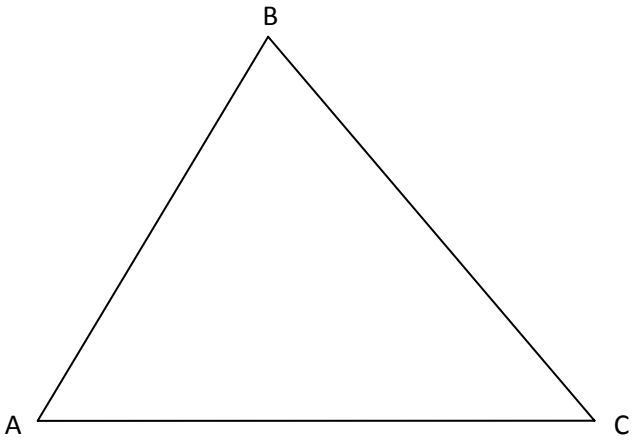
   What is your justification for choosing this name?



2. **Angle bisector of a triangle:** A ray that bisects an angle in a triangle. Draw all angle bisectors of the triangle given.

   Check the appropriate name of the intersection: ☐ incenter; ☐ circumcenter; ☐ orthocenter; ☐ centroid

   What is your justification for choosing this name?

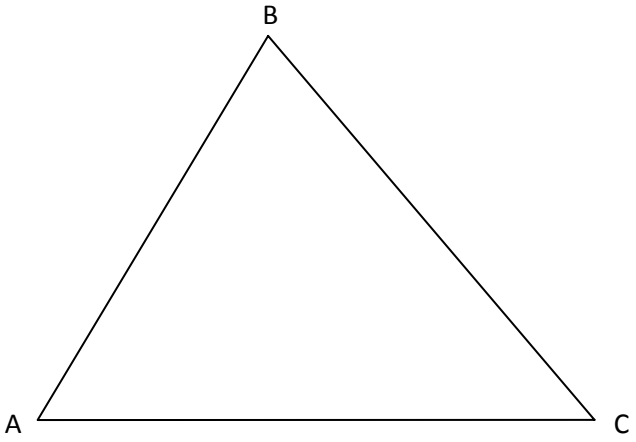


Be sure to leave all markings as a proof of your work!!!

3. **Altitude of a triangle:** Segment that starts at the vertex of a triangle and is perpendicular to the line containing the opposite side of the triangle. Draw all altitudes for the triangles given.

   Check the appropriate name of the intersection: ☐ incenter; ☐ circumcenter; ☐ orthocenter; ☐ centroid

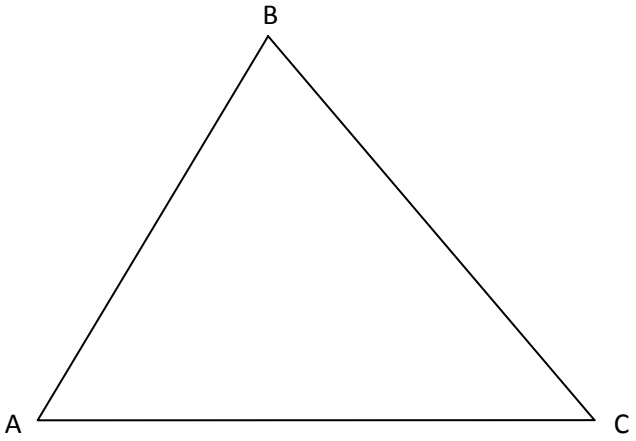
   What is your justification for choosing this name?



4. **Median:** Segment whose endpoints are a vertex of a triangle and the midpoint of the opposite side. Draw all medians of the triangle given.

   Check the appropriate name of the intersection: ☐ incenter; ☐ circumcenter; ☐ orthocenter; ☐ centroid

   What is your justification for choosing this name?



Project #1 **Constructions (1 quiz grade)**

Last Name:_____ First Name: _____ Period _____ Due Date:____/____/_____

The goal of this project is to construct figures using only a compass and a straightedge. When figures are constructed, it guarantees that a line is perpendicular, a triangle is equilateral, etc.

In class, we've learned how to make the following constructions:

- copy a segment
- copy an angle
- perpendicular bisector of a line segment
- perpendicular from a point not on a line
- angle bisector
- constructions in a triangle: perpendicular bisector of a side, angle bisector of a vertex, median, and altitude

PROJECT: You will use the knowledge you gained from the above constructions to create the following 4 constructions inside a ***scalene*** triangle and present them on a poster board:

1. CIRCUCEMTER: the point of concurrency of the 3 perpendicular bisectors of the sides of a triangle
2. INCENTER: the point of concurrency of the 3 angle bisectors of a triangle
3. CENTROID: the point of concurrency of the 3 medians of a triangle
4. ORTHOCENTER: the point of concurrency of the 3 altitudes of a triangle

Circumcenter

1. Draw a scalene triangle
2. Construct the 3 perpendicular bisectors
3. Point of intersection = *circumcenter*; also, the center of the circle
4. Radius=distance from center to any vertex
5. Measure and lock radius
6. Draw circle
7. *Checkpoint:* the circle must go through each vertex of the triangle

Incenter

1. Draw a scalene triangle
2. Construct the 3 perpendicular bisectors
3. Point of intersection = *incenter*, also, the center of the circle
4. Radius=distance from center to a side
5. Construct a perpendicular segment connecting the incenter to a side
6. Measure and lock radius
7. Draw circle
8. *Checkpoint:* the circle must touch each side 1 point only

Centroid

1. Draw a scalene triangle
2. Construct the 3 medians
3. Point of intersection = *centroid*
4. *Checkpoint:* the centroid is 2/3 of the distance from each vertex to the midpoint of the opposite side… what is the significance of the centroid of a triangle and can you demonstrate?

Orthocenter

1. Draw a scalene triangle
2. Construct the 3 altitudes.
3. Point of intersection = *orthocenter*
4. *Checkpoint:* depending on the type of triangle the orthocenter can be inside, on, or outside the triangle… can you tell which?

Helpful Hints

- Use separate piece of blank white paper for each construction.
- Draw each scalene triangle in the center of the paper.
- Use a standard pencil. Do not use mechanical pencil for the compass.
- Don't stop in the middle of the doing each construction. For example, do not stop in the middle of drawing an arc.
- Use different color pencils.