

# Assignment

## Write

Describe the similarities and differences between each pair of terms.

1. concurrent and point of concurrency
2. incenter and orthocenter
3. centroid and circumcenter
4. altitude and median

## Remember

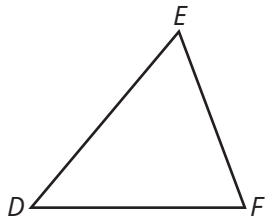
For every triangle:

- The circumcenter is the point of concurrency of the perpendicular bisectors of each side.
- The incenter is the point of concurrency of the angle bisectors.
- The centroid is the point of concurrency of the medians.
- The orthocenter is the point of concurrency of the altitudes.

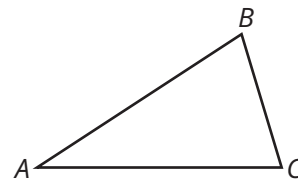
## Practice

1. Use a compass and straightedge to perform each construction.

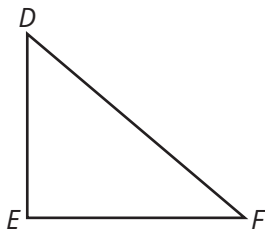
- a. Construct the incenter of  $\triangle DEF$ .



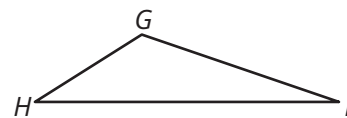
- b. Construct the circumcenter of  $\triangle ABC$ .



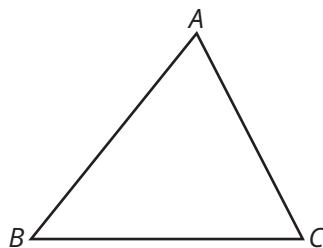
- c. Construct the circumcenter of  $\triangle DEF$ .



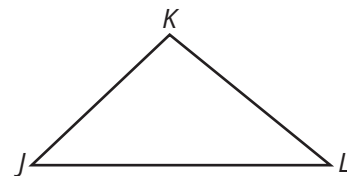
- d. Construct the circumcenter of  $\triangle GHI$ .



- e. Construct the centroid of  $\triangle ABC$ .



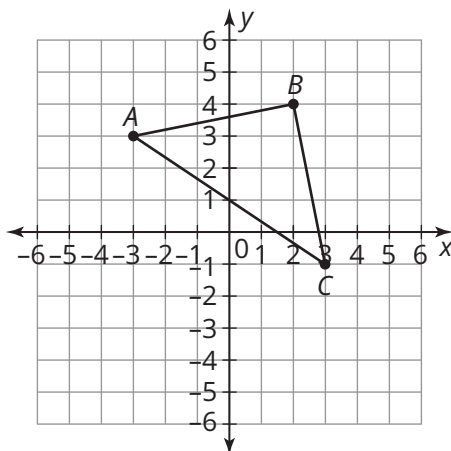
- f. Construct the orthocenter of  $\triangle JKL$ .



2. Write the term that best completes each statement.
  - a. The incenter of a triangle is the point of concurrency of the \_\_\_\_\_ of a triangle.
  - b. The circumcenter of a triangle is the point of concurrency of the \_\_\_\_\_ of a triangle.
  - c. The centroid of a triangle is the point of concurrency of the \_\_\_\_\_ of a triangle.
  - d. The orthocenter of a triangle is the point of concurrency of the \_\_\_\_\_ of a triangle.

## Stretch

1. The Euler Line is a line that represents the relationship between the centroid, circumcenter and orthocenter of any triangle.
  - a. Construct an isosceles triangle and determine all four points of concurrency. How do the points relate to the Euler Line?
  - b. What happens if the triangle is equilateral?
2. Determine the coordinates of the centroid of the triangle on the coordinate grid.



## Review

1. Write a conjecture about points on the perpendicular bisector of a line segment. Then, write the converse of the conjecture.
2. Write a conjecture about the sides of an equilateral triangle. Then, write the converse of the conjecture.
3. Determine whether each statement is biconditional.
  - a. If a figure is a square, then it is a rectangle.
  - b. If two angles are congruent, then they have the same measure.