

Name: \_\_\_\_\_

Period: \_\_\_\_\_

### 6.3 Practice Problems – Centroids and Orthocenters

1) On a separate piece of graph paper, find the coordinates of the centroid of each triangle with the given vertices. Also, find the distances from each vertex and midpoint to the centroid as decimals.

a. A(2, 3) B(8, 1) C(5, 7)

b. S(5, 5) T(11, -3) U(-1, 1)

2) Decide whether the orthocenter is inside, on or outside the triangle. Then find the coordinates of the orthocenter.

a. L(0, 5) M(3, 1) N(8, 1)

b. A(-4, 0) B(1, 0) C(-1, 3)

3) Complete the statement with always, sometimes or never.

a. The centroid is \_\_\_\_\_ on the triangle.

b. The orthocenter is \_\_\_\_\_ outside the triangle.

c. A median is \_\_\_\_\_ the same line segment as a perpendicular bisector.

d. An altitude is \_\_\_\_\_ the same line segment as an angle bisector.

e. The centroid and orthocenter are \_\_\_\_\_ the same point.

f. The centroid is \_\_\_\_\_ formed by the intersection of the three medians.

g. The circumcenter of a scalene triangle is \_\_\_\_\_ inside the triangle.

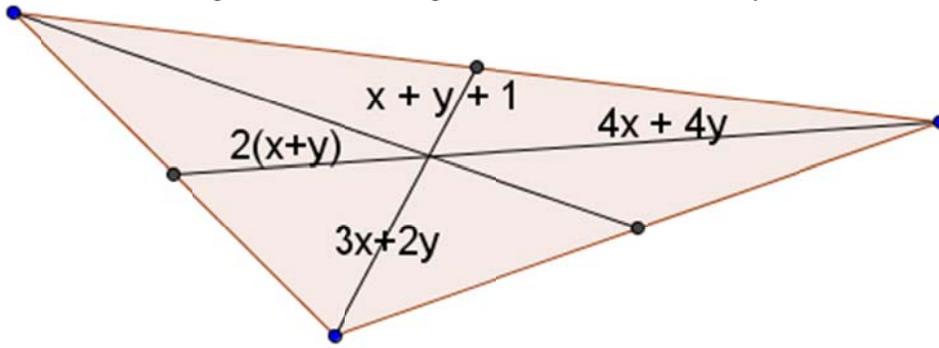
h. If the perpendicular bisector of one side of a triangle intersects the opposite vertex, then the triangle is \_\_\_\_\_ isosceles.

i. The perpendicular bisectors of a triangle intersect at a point that is \_\_\_\_\_ equidistant from the midpoints of the sides of the triangle.

j. The angle bisectors of a triangle intersect at a point that is \_\_\_\_\_ equidistant from the sides of the triangle.

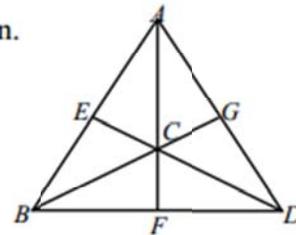
4. Is it possible for the circumcenter, incenter, centroid and orthocenter all to be at the same point?

5. Given the line segments in the triangle are medians, find  $x$  and  $y$ .



6. **Problems**

Use the figure at right and the given information to answer each question.  $C$  represents the centroid of the triangle.



1. If  $BF = 9$ , what is the length of  $\overline{DF}$  ?
2. If  $AC = 8$ , what is the length of  $\overline{CF}$  ? Of  $\overline{AF}$  ?
3. If  $BG = 24$ , what is the length of  $\overline{CG}$  ?
4. If  $BC = 9$  and  $CG = 2x + 1$ , solve for  $x$ .
5. If  $AC = y$  and  $CF = 2.5$ , solve for  $y$ .
6. If  $CD = 14.4$  and  $EC = 8z$ , solve for  $z$ .

7. Given the vertices of the two quadrilaterals, determine if the polygons are congruent, similar or neither.

A(2, 4) B(5, 4) C(6, 2) D(1, 2)

W(6, -12) X(15, -12) Y(18, -6) Z(3, -6)

8. The midpoint of segment TD is E(a, -b). One endpoint is T(-3a, 2b). Find the coordinates of D.

9. What is measure of the acute angle formed by the hands of a clock at 10:30?