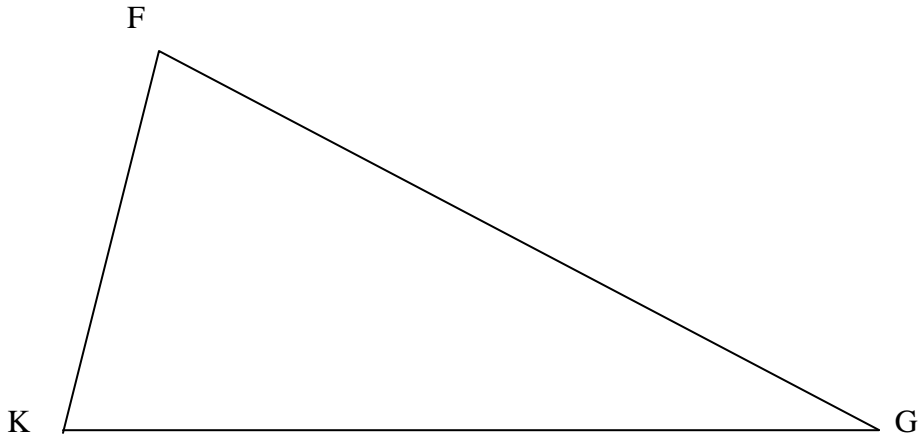


The Construction Project

Name: _____

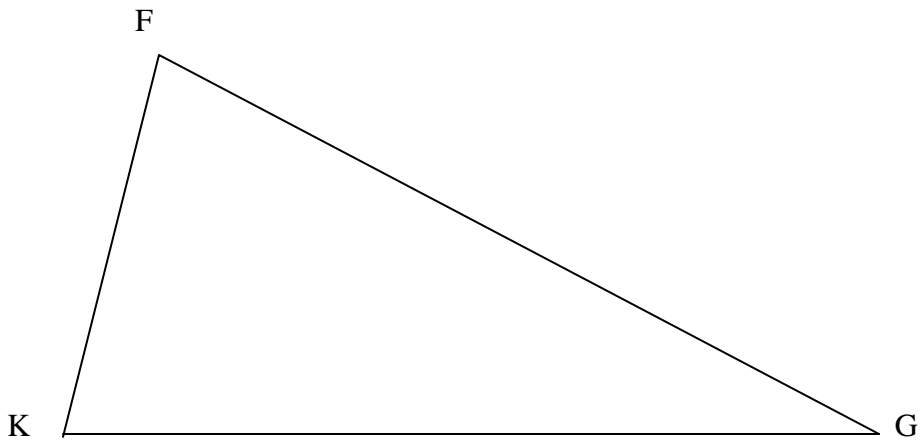
Part 1: The Circumcenter (12 points)

- A. Construct the perpendicular bisector of the 3 sides of triangle FGK. (6 points)
- B. Label the midpoints of each side of triangle FGK using the names M_1 , M_2 , and M_3 . (3 points)
- C. The point where the bisectors meet is called the *circumcenter*. Label it C. (1 point)
- D. Construct the circle C with radius CK to circumscribe triangle FGK. (2 points)



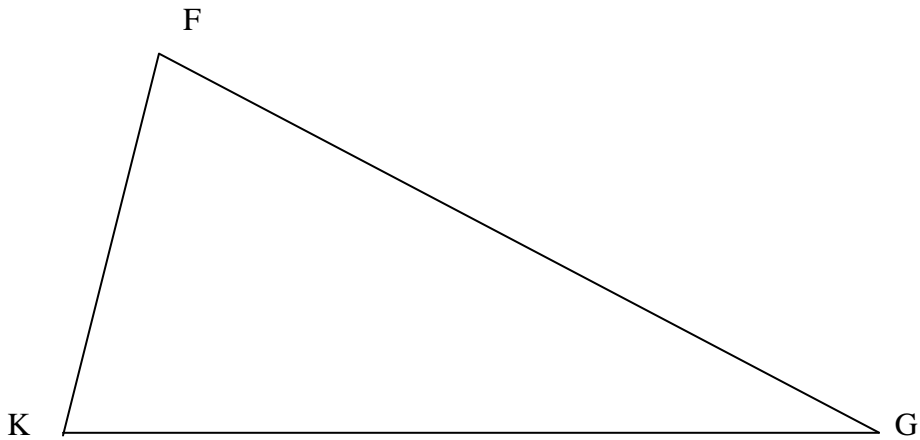
Part 2: The Incenter (11 points)

- A. Bisect the 3 angles of triangle FGK. (6 points)
- B. The points where the bisectors meet is called the *incenter*. Label it I. (1 point)
- C. Construct a line t perpendicular to segment FK that passes through the point I. (1 point)
- D. Label the point where line t intersects FK point T. (1 point)
- E. Construct the circle I with radius IT to inscribe triangle FGK. (2 points)



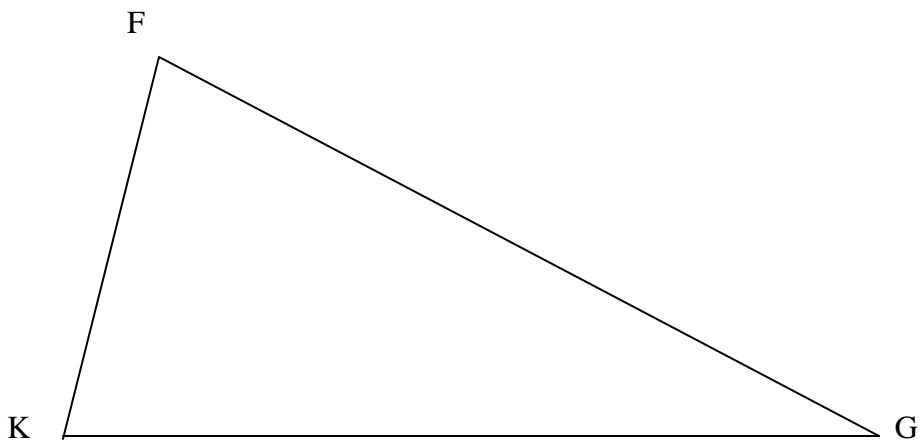
Part 3: The Orthocenter (13 points)

- A. Construct a perpendicular from each vertex of triangle FGK to its opposite side. These segments are called *altitudes*. (6 points)
- B. Label the *feet of the altitudes* (the intersection of the altitude with the side of the triangle) using the names A_1 , A_2 , and A_3 . (3 points)
- C. The point where the altitudes meet is called the *orthocenter*. Label it O. (1 point)
- D. Find the midpoints of the three segments OK, OF, and OG and label them H_1 , H_2 , and H_3 , respectively. (3 points)



Part 4: The Centroid (13 points)

- A. Bisect the three sides of triangle FGK. (6 points)
- B. Label the midpoints of the sides using the names M_1 , M_2 , and M_3 . (3 points)
- C. A *median* is a segment that extends from the midpoint to the opposite vertex within a triangle. Draw the 3 medians and label them m_1 , m_2 , and m_3 . (3 points)
- D. The point where the medians meet is called the *centroid*. Label it P. (1 point)



Part 5: The Nine Point Circle. (17 points)

- A. Use Part 1's triangle FGK to copy the points M_1 , M_2 , and M_3 and C onto a new triangle FGK. (4 points)
- B. From Part 3, copy the points A_1 , A_2 , A_3 , and H_1 , H_2 , H_3 , and O onto the new triangle FGK. (7 points)
- C. From Part 4, copy the point P onto the new triangle FGK. (1 point)
- D. Draw the segment OC. (1 point)
- E. Bisect segment OC and label the midpoint E. (1 point)
- F. Construct the circle E with radius EM. It should pass through nine points if you have worked accurately through Parts 1-4. The nine points are: A_1 , A_2 , A_3 , and H_1 , H_2 , H_3 , and finally, M_1 , M_2 , and M_3 . (3 points)
- G. With a straightedge, draw line OC. This line is called the Euler Line and should pass through the centroid, P, the orthocenter, O, the circumcenter, C, and the midpoint of segment OC, E. (1 point)

