Name:______ M621: Elementary Geometry (Fall 2017) Instructor: Justin Ryan Chapter 1 Exam



Read and follow all instructions. You may not use any notes or electronic devices. You may use a compass, straightedge, and colored pens/pencils.

Part I: Definitions and Theorems [4 points each]

Clearly write the letter corresponding to the missing word on the given line.

Word Bank:

B. straight	C. collinear
E. Star Trek Lemma	F. circumcircle
H. Pythagorean Theorem	I. orthocircle
K. Garfield Theorem	L. circular
N. altitude	O. cyclic
	 B. straight E. Star Trek Lemma H. Pythagorean Theorem K. Garfield Theorem N. altitude

- **1.** A circle is said to be ______ if each side of a polygon is tangent to the circle.
- **2.** A set of points is said to be ______ if they all lie on the same line.
- **3.** The ______ states that the measure of an angle inscribed in a circle is half of the angular measure of the arc it subtends.
- ____4. A quadrilateral whose vertices all lie on a single circle is called a ______ quadrilateral.
- **5.** The circle passing through all three vertices of a triangle is called the _____ of the triangle.

Part I: Written Problems [10 points each]

Follow all instructions exactly. As always, you should use complete sentences and show enough work.

6. Copy one half of the given angle. List the steps.



7. Construct the perpendicular bisector of the given segment. List the steps.

• A

8. Divide the segment into 3 equal pieces. List the steps.

в Α

9. Construct a triangle given a, m_a , and h_a . List the steps.



10. Consider the following construction.



Method of Construction. Suppose the line segment \overline{AB} and the point *C* are given. Draw the line segment \overline{AC} , then construct the equilateral triangle on \overline{AC} by using the method of the proof of Proposition 1.1.1. Denote the third vertex of this triangle by *D*. Next, construct the circle centered at *A* with radius \overline{AB} . Extend the line segment \overline{DA} and denote the intersection of this ray with the last constructed circle as *E*. Now construct the circle centered at *D* with radius \overline{DE} . Extend the line segment \overline{DC} and denote the intersection of this ray with the last constructed circle as *F*.

Claim. The line segment \overline{CF} is equal in length to \overline{AB} .

Prove the claim.

11. Given the segments 1, *a*, and *b*, construct the number $\frac{a}{b}$. List the steps.



12. Given a segment of unit length, construct the number $\sqrt{3}$. List the steps.

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13. Give your favorite proof of the *Pythagorean Theorem*.