1. Write "every equilateral triangle is equiangular" in *if-then* form. Is its converse logically equivalent?
2. Let L be a line not in plane P, but $A \in L \cap P$. Prove that $A = L \cap P$.
3. Let $A[a]$ and $B[b]$ be two points that are distance 3 apart. Write the coordinate b in terms of a. (There are two possible right answers; can you find them both?)
4. Let $A - B - C$ and $\angle ABD$ and $\angle DBC$ be a collinear pair. Let $\overrightarrow{BE}$ and $\overrightarrow{BF}$ bisect $\angle ABD$ and $\angle DBC$, respectively. Prove that $m\angle EBF = 90$.
5. Prove the set of points equidistant from points A & B forms the perpendicular bisector of $\overline{AB}$.
6. Let $A - B - C$ and point D not on $\overline{AB}$. Construct segments $\overline{DA}$, $\overline{DB}$, and $\overline{DC}$ and assume that $m\angle DAC = 90$. What can be said about $x = m\angle DBA$ and $y = m\angle DCA$?
7. If a triangle has a right angle, why must the opposite side have the greatest length?
8. What is *Taxicab Geometry*, and why was it important?
9. Prove $SASAA$ for two convex quadrilaterals.
10. Given the Euclidean Parallel Postulate, prove that two lines cut by a transversal are parallel if a pair of interior angles on the same side of the transversal are supplementary.
11. How is a tiling with 3 regular pentagons at each vertex possible?
12. Axiomatize *area*. In other words, what properties would you expect *area* to have? (The book lists 6; I would expect you to be able to generate at least 3 reasonable axioms.)
13. Who was most important in discovering hyp. geom.? Why?
14. Comment on "Angels and Devils," by M. C. Escher, at right. What is the artist saying, and how is he using geometry to say it?

15. We split neutral geometry into Euclidean and Hyperbolic geometries by adding the parallel and hyperbolic postulates, respectively. To axiomatize spherical geometry, we add the spherical postulate, but also change two axioms of neutral geometry. Write the spherical postulate, name the two axioms that need re-writing, and describe how to re-write them.

1. Write "every equilateral triangle is equiangular" in *if-then* form. Is its converse logically equivalent?
2. Let L be a line not in plane P, but $A \in L \cap P$. Prove that $A = L \cap P$.
3. Let $A[a]$ and $B[b]$ be two points that are distance 3 apart. Write the coordinate b in terms of a. (There are two possible right answers; can you find them both?)
4. Let $A - B - C$ and $\angle ABD$ and $\angle DBC$ be a collinear pair. Let $\overrightarrow{BE}$ and $\overrightarrow{BF}$ bisect $\angle ABD$ and $\angle DBC$, respectively. Prove that $m\angle EBF = 90$.
5. Prove the set of points equidistant from points A & B forms the perpendicular bisector of $\overline{AB}$.
6. Let $A - B - C$ and point D not on $\overline{AB}$. Construct segments $\overline{DA}$, $\overline{DB}$, and $\overline{DC}$ and assume that $m\angle DAC = 90$. What can be said about $x = m\angle DBA$ and $y = m\angle DCA$?
7. If a triangle has a right angle, why must the opposite side have the greatest length?
8. What is *Taxicab Geometry*, and why was it important?
9. Prove $SASAA$ for two convex quadrilaterals.
10. Given the Euclidean Parallel Postulate, prove that two lines cut by a transversal are parallel if a pair of interior angles on the same side of the transversal are supplementary.
11. How is a tiling with 3 regular pentagons at each vertex possible?
12. Axiomatize *area*. In other words, what properties would you expect *area* to have? (The book lists 6; I would expect you to be able to generate at least 3 reasonable axioms.)
13. Who was most important in discovering hyp. geom.? Why?
14. Comment on "Angels and Devils," by M. C. Escher, at right. What is the artist saying, and how is he using geometry to say it?

15. We split neutral geometry into Euclidean and Hyperbolic geometries by adding the parallel and hyperbolic postulates, respectively. To axiomatize spherical geometry, we add the spherical postulate, but also change two axioms of neutral geometry. Write the spherical postulate, name the two axioms that need re-writing, and describe how to re-write them.