Math 487
Properties Resulting from Different Parallel Postulates

Properties of Euclidean, Hyperbolic, and Elliptic Geometries:

Euclidean	**Hyperbolic**	**Elliptic**
Two distinct non-parallel lines intersect in one point.	Two distinct non-parallel lines intersect in one point.	(single) Two distinct lines intersect in one point. (double) Two distinct lines intersect in two points.
The sum of the measures of the angles of a triangle is 180.	The sum of the measures of the angles of a triangle is less than 180.	The sum of the measures of the angles of a triangle is more than 180.
Similar triangles that are not congruent exist.	Similar triangles are congruent.	Similar triangles are congruent.
Rectangles exist.	No quadrilateral is a rectangle.	No quadrilateral is a rectangle.
A line does not have finite length and is unbounded.	A line does not have finite length.	A line has finite length and is unbounded.
Two parallel lines are equidistant.	No two parallel lines are equidistant.	Parallel lines do not exist.
The summit angles of a Saccheri quadrilateral are right angles.	The summit angles of a Saccheri quadrilateral are acute angles.	The summit angles of a Saccheri quadrilateral are obtuse angles.
Two distinct lines do not enclose a finite area.	Two distinct lines do not enclose a finite area.	Two distinct lines enclose a finite area.
The area of a triangle is equal to half the product of the base and height.	The area of a triangle is proportional to its "defect".	The area of a triangle is proportional to its "excess".
A unique line perpendicular to a given line through a point not on the line.	A unique line perpendicular to a given line through a point not on the line.	(single) All lines perpendicular to a given line intersect at a point (pole). (double) All lines perpendicular to a given line intersect at a two antipodal points.
A line separates a plane.	A line separates a plane.	(single) A line does not separate a plane. (double) A line separates a plane.