Models of incidence geometry:

Model #1:

- Points: A, B, C
- Lines: {A, B}, {A, C}, {B, C}
- Point lies on *l* if the letter belongs to the set *l*.

Model #2:

- Points: A, B, C, D
- Lines: {A, B}, {A, C}, {A, D}, {B, C}, {B, D}, {C, D}
- Point lies on *l* if the letter belongs to the set *l*.

Model #3 (Cartesian plane):

- Points: ordered pairs of real numbers (x, y)
- Lines: triples of real numbers (a, b, c) so that either $a \neq 0$ or $b \neq 0$. It is the set of all points (x, y) that satisfy the equation $ax + by + c = 0$.
- Point lies on *l* if it is a solution of the *l*'s equation.

Model #4 (Real projective plane):

- Points: unordered pairs {(x,y,z), (-x,-y,-z)}, where (x,y,z) lies on the unit sphere
- Lines are sets of points {(x,y,z), (-x,-y,-z)} that are parts of great circles on the unit sphere.
- Point lies on the line if both (x,y,z), (-x,-y,-z) lie on the corresponding great circle.

Model #5 (Hyperbolic plane):

- Points: ordered pairs of real numbers (x, y), where $y > 0$.
- Lines:
  - Subsets of vertical lines that consist of points (x, y), with $y > 0$
  - Semicircles whose centers are points (x, 0), where x is a real number

Models of affine geometry (3 incidence geometry axioms + Euclidean PP) are called affine planes and examples are

Model #2

Model #3 (Cartesian plane).

Model of (3 incidence axioms + hyperbolic PP) is

Model #5 (Hyperbolic plane).

Models of projective geometry are called projective planes. Projective geometry consists of axioms *I-1, I-2+, I-3* and Elliptic PP. *I-2+* states: For every line *l* there are at least three distinct points lying on it. Examples of projective planes are:

Model #6 (projective completion of Model #2):

- Points: A, B, C, D, E, F, G
- {A, B, E}, {A, C, F}, {A, D, G}, {B, C, G}, {B, D, F}, {C, D, E}, {E, F, G}
- Point lies on *l* if the letter belongs to the set *l*.

Model #4 Real projective plane (projective completion of Cartesian plane)