4. Option II: Axioms and Models

Consider the following axiom system:
Undefined term: *points.*
Definition: Let X be a set of points, a certain subset of X is called *line.*
Definition: Two lines that have no points in common are said to be *parallel.* Axioms:

1. There exists at least one point and at least one line.
2. If X and Y are two distinct points, there is a unique line containing them both.
3. Through a given point not on a given line, there is a unique line parallel to the given line.
4. Not all points are on the same line.

Questions:

a) Say which lines are parallel in each of the figures and give a reason for your answer.

b) Which of the figures below is a model for this axiom system? Justify your answer.

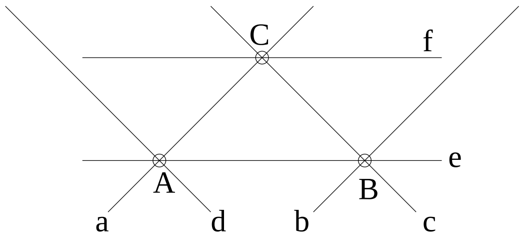

Figure 1: Points are represented as little circles in this figure. If something is not a circle, it's not a point! Points are labeled with capital letters, lines with lowercase letters. For example, line c consists exactly of points B and C.

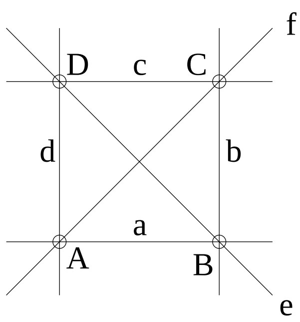

Figure 2: Points are represented as little circles in this figure. If something is not a circle, it's not a point! Points are labeled with capital letters, lines with lowercase letters.