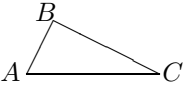
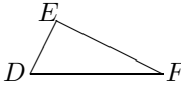


1. Below are several interpretations for the undefined terms in Incidence Geometry. For each interpretation, clearly and thoroughly explain why **each** axiom I-1, I-2, and I-3 holds or fails. (Your justifications should do more than just state what the axiom - or its negation - says. Give extra info about how you can tell it meets or fails its conditions.)

- (a) "Points" are the letters $A, B, C, D, E,$ and F . There are two lines: one is the triangle  and the other is the triangle . " P lies on ℓ " means P is a vertex of triangle ℓ .

- (b) "Points" are students at SRU. "Lines" are courses offered at SRU this semester. "Lie on" means the student is taking the course. (Hint: You don't need to literally know every student's schedule. For this interpretation, just think about what's *reasonable* to expect of people's schedules here.)

- (c) Let n be a fixed integer that's greater than 3. The set of points is the collection of distinct symbols A_1, A_2, \dots, A_n . The set of lines consists of all sets of the form $\{A_i\}$ or $\{A_i, A_j\}$ where $i \neq j$. "Lie on" means "is an element of."

- (d) Points are individual real numbers. Lines are non-empty intervals of the form (a, b) where $a, b \in \mathbf{R}$. (Infinity is NOT a number!!!) A point lies on a line if that point belongs to the interval.

- (e) Points are members of $S = \{0, 1, 2, 3, 4\}$. Lines are also members of S . P lies on ℓ means $2P + \ell > 3$.

- (f) Points are members of $T = \{-2, -1, 0, 1, 2\}$. Lines are also members of T . P lies on ℓ means $(P - 1)(\ell + 1) < 1$.

2. Rigorously prove the following Theorems from our text. For each proof, you may use ONLY our Incidence Axioms, our IG definitions, and any Propositions that come EARLIER in the list than the one you are currently proving. (This demonstrates how an axiomatic system is restricted in what can/cannot be known.)

- (a) Theorem 2.6.4 (Be careful not to over-assume about P , as we modeled in class.)

- (b) Theorem 2.6.5

- (c) Theorem 2.6.7 on p.40