

Due February 13, 2001

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Name

Directions: Be sure to include in-line citations, including page numbers if appropriate, every time you use the results of discussion, a text, notes, or technology. **Only write on one side of each page.**

*“Reductio ad absurdum, which Euclid loved so much, is one of a mathematician’s finest weapons. It is a far finer gambit than any chess play: a chess player may offer the sacrifice of a pawn or even a piece, but a mathematician offers the game.”* – Godfrey H. Hardy

**Problems for Discussion in class (Not to be turned in)**

1. Review Exercises page 103.
2. Exercise 4 page 104.
3. Exercise 6 page 104.

**0.1 Outlined Problems**

1. Exercise 1 page 104 parts (a) and (b) only.
  - (a) The only possible non-distinct pair is  $B, D$ . And  $B = D$  contradicts a betweenness axiom.
  - (b) Points  $A, B, C$  are on line  $\overleftrightarrow{AC}$ . Points  $A, C, D$  are on line  $\overleftrightarrow{AC}$ .
2. Exercise 9 page 106. Given a line  $l$ , a point  $A$  on  $l$ , and a point  $B$  not on  $l$ . Then every point of the ray  $\overrightarrow{AB}$  (except  $A$ ) is on the same side of  $l$  as  $B$ .
  - (a) Suppose not so there is a point  $X$ , other than  $A$ , on ray  $\overrightarrow{AB}$  that is either on  $l$  or is opposite  $l$  from  $B$ .
  - (b) The first case contradicts proposition 2.1.
  - (c) In the second case, there is a point  $Y$  on line  $\overleftrightarrow{AB}$  that is also on line  $l$  and  $X * Y * B$
  - (d) This contradicts proposition 2.1.

**0.2 Problems**

1. Exercise 12 page 106 (the Crossbar Theorem: there is a hint in the textbook.)
2. Exercise 16 page 106.