

Due April 2, 2004

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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.**

*“The good Christian should beware of mathematicians and all those who make empty prophesies. The danger already exists that the mathematicians have made a covenant with the devil to darken the spirit and to confine man in the bonds of Hell.”* – Saint Augustine (from page 209 of Greenberg)

**Problems**

1. Do **one** (1) of the following.
  - (a) Using any result through Chapter 5 and any previous exercise, do exercise 20 on page 171 of Greenberg. Note that this is a problem in Euclidean geometry rather than neutral geometry.
  - (b) Using any result through Chapter 5. Prove that Euclid’s fifth postulate implies Wallis’ postulate.
  
2. Do **one** (1) of the following.
  - (a) Using any result through Chapter 5 and any previous exercise, do exercise 11 on page 168 of Greenberg) That is, find and explain the flaw in Gergonne’s attempted proof of the parallel postulate.
  - (b) In neutral geometry, let  $E$  denote the Euclidean parallel postulate and  $H$  denote the hyperbolic parallel axiom. Show that any statement  $S$  in the language of neutral geometry that is a theorem in Euclidean geometry and whose negation is a theorem in hyperbolic geometry is equivalent (in neutral geometry) to the parallel postulate. [This is a slick way to find statements that are equivalent to the parallel postulate.]