

ter of the circum-  
and  $D'$  the point  
bisector of  $\sphericalangle OBC$ ,

$(\sphericalangle ACD')^\circ$  so that

ise 10, Chapter 6.)  
vo angles subtend  
en by the exterior  
, so if  $E$  were also  
in  $180^\circ$ ; similarly,  
ould add up to more

SAA), so  $EA \cong FA$   
se  $EF$  of an isosce-  
dicular bisector of  
DFC (hypotenuse-  
across  $\overleftrightarrow{DA}$ , then  
e of  $E, F$  is inside  
nce  $G$  is the mid-  
 $\overleftrightarrow{GF} \perp \overleftrightarrow{DA}$  so that  
 $\overleftrightarrow{DA}$ .

# 2

from Instructor's Manual for Euclidean and  
Non-Euclidean Geometries, 4th ed., by  
M. J. Greenberg

I inadvertently omitted review exercises for Chapter 2 from the fourth edition. Here are some if you wish to offer them to your students:

- (1) To "disprove" a statement means to prove the negation of that statement.
  - (2) There is no way to program a computer to prove or disprove every statement in mathematics.
  - (3) A "model" of an axiom system is the same as an "interpretation" of the system.
  - (4) The negation of the statement "If 3 is an odd number then 9 is even" is the statement "If 3 is an odd number then 9 is odd."
  - (5) The negation of a conjunction is a disjunction.
  - (6) The statement "Base angles of an isosceles triangle are congruent" has no hidden quantifiers.
  - (7) The negation of the statement "All triangles are isosceles" is "No triangles are isosceles."
  - (8) The converse of the statement "If you push me then I will fall" is the statement "If you push me then I won't fall."
  - (9) Whenever a conditional statement is valid, its converse is also valid.
  - (10) The statement "Every point has at least two lines passing through it" is independent of the axioms for incidence geometry.
  - (11) The statement "If  $l \parallel m$  and  $m \parallel n$ , then  $l \parallel n$ " is independent of the axioms for incidence geometry.
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- (12) Incidence geometry is consistent.
  - (13) Whenever a statement in plane projective geometry is a theorem, so is its dual.
  - (14) All four-point models of incidence geometry are isomorphic to one another.