

Math 1: Fundamental Math Concepts I
Workshop 1: Deductive Reasoning
Due Wednesday September 14 at the start of class

1. Give a novel example of
 - (a) “the fallacy of the converse,” (p.59 of Long and DeTemple).
 - (b) “the fallacy of the inverse,” (p.60 of Long and DeTemple).

2. Given a conditional statement ($p \rightarrow q$) it is often useful to consider three related conditional statements: the *inverse* ($\tilde{p} \rightarrow \tilde{q}$), the *converse* ($q \rightarrow p$), and the *contrapositive* ($\tilde{q} \rightarrow \tilde{p}$). For each of the related statements, discuss the correspondence, if any, between the truth value of the conditional statement and the truth value of the related statement. In particular,
 - (a) When the conditional statement is true, must the related statement be true also? If so, provide a proof. If not, give a counter-example.
 - (b) When the conditional statement is false, must the related statement be false also? If so, provide a proof. If not, give a counter-example.

3. Compare and contrast the methods of indirect reasoning from a conditional statement and direct reasoning from the contrapositive statement. [*Hint: It may help to discuss a specific example.*]