

Homework 5

Math 220 (section 906), Fall 2018

This homework is due on Thursday, September 27. (Turn in your answers to questions 1–4.) You may cite results from class, as appropriate.

0. (*This problem is not to be turned in.*) Read Section 3.2.

1. Prove or disprove the following claims:

- (a) Every odd integer can be expressed as the product of two odd integers.
- (b) Every even integer can be expressed as the product of two even integers.
- (c) For real number x and y , if $xy \neq 0$, then $x \neq 0$.
- (d) Let n be an integer. If $2|(n^2 - 5)$, then $4|(n^2 - 5)$.
- (e) Let n be an integer. If $2|(n^2 - 5)$, then $8|(n^2 - 5)$.

2. Is there something wrong with this supposed proof? If so, identify all the errors, and then either prove or disprove the claim. If not, explain why the proof is complete.

Claim: The average of three even numbers is an even number.

Proof: We proceed by contradiction: assume that the average of three even numbers is odd. However, the average of 2, 4, and 6, which is 4, is even. This is a contradiction.

3. Are the following statements logically equivalent? (Explain your answer.)

- (i) When I drive, I don't text.
- (ii) I never drive and text.

4. Section 3.2 #1, 2