

Problem Set I: Due Friday, February 27, 2009
Spring 2009

Math 190
Dr. Wiglesworth

Name: _____

You must *show all work* to receive full credit.

Answers and assertions must be fully explained and justified.

Your solutions must be clear, concise, and easy to follow.

You must cite any sources used for this assignment.

1. Determine whether the following are logically equivalent:

$$p \text{ and } (p \wedge (\sim (\sim p \vee q))) \vee (p \wedge q)$$

2. Determine whether the following argument is valid:

If I graduate on time, then my parents will buy me a car or my parents will give me money.

My parents did not buy me a car or they did not give me money.

Therefore, I did not graduate on time or I did not receive money from my parents.

3. Page 56, number 25.

4. Prove that $1 \cdot 3 \cdot \dots \cdot (2n - 1) \geq 2 \cdot 4 \cdot \dots \cdot (2n - 2)$ for every integer $n \geq 2$.

5. Consider the Fibonacci numbers which are defined by $F_1 = 1$, $F_2 = 1$, and if $n > 2$, then $F_n = F_{n-1} + F_{n-2}$. Prove that $F_n \leq 2^n$ for every positive integer n .

6. Page 243, number 16.

7. How many positive three-digit integers are multiples of 6, and what is the probability that a three-digit number chosen at random will be a multiple of 6?

8. Page 320, number 30.