Instructor: Leo Goldmakher

Name (Last, Nickname): ____________________

Section # (10am = 1, 11am = 2): ____________

Williams College
Department of Mathematics and Statistics

MATH 200 : DISCRETE MATH

Problem Set 1 – due Thursday, February 7th

INSTRUCTIONS:

This assignment must be turned in to my mailbox (on the right as you enter Bascom) by **4pm** sharp. Late assignments may be submitted at the beginning of Friday's class to me in person (i.e. don't leave them in my mailbox or ask someone else to submit on your behalf); however, 5% will be deducted for late submission. *Assignments submitted later than start of class on Friday will not be graded.*

Please print and attach this page as the first page of your submitted problem set.

PROBLEM	GRADE
Text 1.1	
Text 2.1	
Text 3.11	
1.2	
1.3	
1.4	
1.5	
Total	

Please read the following statement and sign **before writing the final version of this problem set:**

I understand that I am not allowed to use the internet to assist with this assignment, apart from accessing the course website or looking up definitions. I also understand that I must write down the final version of my assignment in isolation from any other person, and to not copy from any set of written notes created when another person was present. I pledge to abide by the Williams honor code.

SIGNATURE:____

Problem Set 1

1.1 Textbook problems # 1.1, 2.1, 3.11

1.2 Given an integer N and real numbers a and d. Discover (don't look it up!) and prove a formula for the sum

$$a + (a + d) + (a + 2d) + \cdots + (a + (N - 1)d).$$

1.3 Given an integer N and a real number r. Discover (don't look it up!) and prove a formula for the sum

$$1 + r + r^2 + r^3 + \cdots + r^{N-1}.$$

[*Hint: Let S denote the sum. What can you say about rS?*]

1.4 Prove that $\sqrt{3}$ cannot be written as a fraction. (Here and below, by "fraction" I mean the ratio of two integers.)

1.5 (a) In class we saw that $\frac{17}{12}$ is a decent approximation to $\sqrt{2}$. Find a fraction that's a better approximation to $\sqrt{2}$.

(b) Find a fraction that's a better approximation to $\sqrt{2}$ than your answer in part (a).

(c) Can you describe a general method for finding a sequence of fractions that get closer and closer to $\sqrt{2}$?