

Autobiography. Due Tuesday 4:30 PM at my office.


This assignment will help me to get to know those of you I do not know already and to catch up with those of you I do. Your autobiographical statement should be more than one full page but not greater than two in length and should be typed.

Include:

- (a) your major and minor (or what you imagine they might be),
- (b) the reason you are taking this course,
- (c) your favorite mathematical topic or experience,
- (d) your least favorite mathematical topic or experience,
- (e) your (potential) career choices,
- (f) your favorite hobbies or pastimes, and anything else about yourself that you think I should know.

Note: On Tuesday (when you drop off your autobiography), I will ask you to sign up for a short meeting with me in my office later in the week.

Reading and Journal Assignment

1. **Read for next class:** Chapter 0, pages 1–13 in *Mathematical Proofs*. This section is a great guide to writing mathematics clearly. You should re-read this throughout the semester.
2. Read Section 1.1 and the first page of Section 1.2 (pages 14–18). Remember that an assignment to **read** the text includes carefully working through all examples (there are 5 in this reading) so that you are ready to ask questions about, discuss, and present the material.
3. Begin a glossary of **key terms** and their **definitions** at the back of your journal. In today's reading, the key terms from include: set, element, empty set, natural numbers, rational and irrational numbers, real numbers, cardinality, finite and infinite sets, and subset. Many are familiar, but some are new. Knowing definitions of key terms will be critical to your success in and enjoyment of this course.
4. Review the syllabus (even though we went over this in class, you should read it again to make sure there are no surprises). Note the exam dates.
5. Bookmark the class website (see the syllabus for the address). You should check it daily.  I use the Math/CS Department's server; I do not use *Canvas*.
6. Bring your text to class; together we will work on a number of the exercises.
7. Work out problems 1.1–1.6 on pages 29–30 in the text in your **Journals**. We will cover at least some of these in class (see back of page).
8. Collected Work due Friday (additional problems assigned on Wednesday): Page 30: Exercise 1.8. Page 35: Exercises 1.67, 1.68 (Take note of the the set S .), 1.69, and 1.70. (See link on line regarding solutions.)

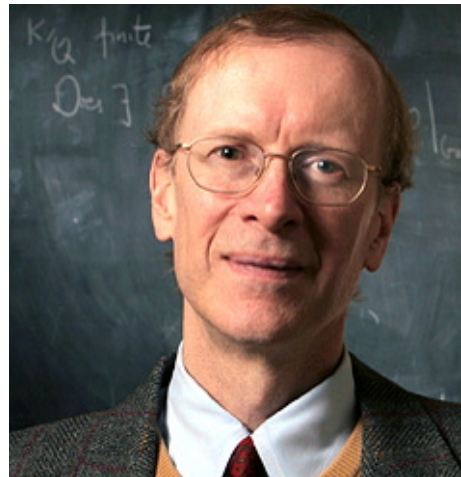



Figure 1: Bonus: Who is this person?

 Just like the road sign, this symbol is meant to indicate a warning. It will usually appear in the margin of the handout.

This Week's Groups

Today each group should work on their corresponding problems below from pages 29 and 30 in the text (also below) to present at the end of class and the beginning of next class, if necessary. (Members of groups should complete any of these we do not get to today.) These problems should eventually be included in your Journal.

1	Wenshi	Zhentian	Lauren	Jasmine	Prob # 1.1(a), 1.3(d), 1.3(e), 1.4(b). If time allows, 1.5.
2	Ziyi	Josh	Lu	August	Prob # 1.1(b), 1.2(d), 1.3(f), 1.4(c). If time allows, 1.6.
3	Patrick	Jacqueline	William	Anthony	Prob # 1.1(c), 1.2(c), 1.3(a), 1.4(d). If time allows, 1.7.
4	Yifan	Jiahao	Katherine	Matt	Prob # 1.1(d), 1.2(b), 1.3(b), 1.4(e). If time allows, 1.9.
5	Chengrui	Connor	Ashley	Adam	Prob # 1.1(e), 1.2(a), 1.3(c), 1.4(a). If time allows, 99.

1. Which of the following are sets?

(a) $1, 2, 3$ (b) $\{1, 2\}, 3$ (c) $\{\{1\}, 2\}, 3$ (d) $\{1, \{2\}, 3\}$ (e) $\{1, 2, a, b\}$

2. Let $S = \{-2, -1, 0, 1, 2, 3\}$. Describe each of the following sets as $\{x \in S : p(x)\}$, where $p(x)$ is some condition on x .

(a) $A = \{1, 2, 3\}$ (b) $B = \{0, 1, 2, 3\}$ (c) $C = \{-2, -1\}$ (d) $D = \{-2, 2, 3\}$

3. Determine the cardinality of each of the following sets:

(a) $A = \{1, 2, 3, 4, 5\}$ (b) $B = \{0, 2, 4, \dots, 20\}$ (c) $C = \{25, 26, 27, \dots, 75\}$
 (d) $D = \{\{1, 2\}, \{1, 2, 3, 4\}\}$ (e) $E = \{\emptyset\}$ (f) $F = \{2, \{2, 3, 4\}\}$

4. Write each of the following sets by listing its elements within braces.

(a) $A = \{n \in \mathbb{Z} : -4 < n \leq 4\}$ (b) $B = \{n \in \mathbb{Z} : n^2 < 5\}$ (c) $C = \{n \in \mathbb{N} : n^3 < 100\}$
 (d) $D = \{x \in \mathbb{R} : x^2 - x = 0\}$ (e) $E = \{x \in \mathbb{R} : x^2 + 1 = 0\}$

5. Write each of the following sets in the form $\{x \in \mathbb{Z} : p(x)\}$, where $p(x)$ is a property concerning x .

(a) $A = \{-1, -2, -3, \dots\}$ (b) $B = \{-3, -2, \dots, 3\}$ (c) $C = \{-2, -1, 1, 2\}$

6. The set $E = \{2x : x \in \mathbb{Z}\}$ can be described by listing its elements as $E = \{\dots, -4, -2, 0, 2, 4, \dots\}$. Do the same for these sets.

(a) $A = \{2x + 1 : x \in \mathbb{Z}\}$ (b) $B = \{4n : n \in \mathbb{Z}\}$ (c) $C = \{3q + 1 : q \in \mathbb{Z}\}$

7. The set $E = \{\dots, -4, -2, 0, 2, 4, \dots\}$ of even integers can be described by means of a defining condition by $E = \{2x : x \in \mathbb{Z}\}$. Describe these sets similarly.

(a) $A = \{\dots, -4, -1, 2, 5, 8, \dots\}$ (b) $B = \{\dots, -10, -5, 0, 5, 10, \dots\}$ (c) $C = \{1, 8, 27, 64, 125, \dots\}$

9. Let $A = \{2, 3, 5, 7, 8, 10, 13\}$, $B = \{x \in A : x = y + z, \text{ where } y, z \in A\}$, and $C = \{r \in B : r + s \in B \text{ for some } s \in B\}$. Determine set C .

99. Write each of the following sets by listing its elements within braces or using interval notation, as needed.

(a) $A = \{x \in \mathbb{N} : x \leq \pi\}$ (b) $B = \{x \in \mathbb{Z} : x \leq \pi\}$ (c) $C = \{x \in \mathbb{R} : x \leq \pi\}$