Math 4303 **FUNDAMENTALS OF MATH** Fall 2013
Dr. Duval **Homework**
Thursday, August 29

Follow the separate general guidelines for Parts A,B,C. Be sure to include and label *all four* standard parts (a), (b), (c), (d) of Part A in what you hand in.

Periodic decimals

Section 2.1.3 (and last two pages of section 2.1.2)

A: Reading questions. Due by 3pm, Wed., 4 Sep.

1. Why doesn't the proof of Theorem 2.4 actually prove that the period of the repeating decimal of a/b **equals** $b-1$ instead of merely being **at most** $b-1$?
2. Give three more examples of each of the types of decimals in Table 3.
3. Can you use a calculator to find the period of a repeating decimal? Can you do it always? Explain.
4. Theorems 2.5 and 2.6 both describe the rational number form of a terminating decimal. What is the difference between these two theorems? Why would we want more than one theorem like this? (In other words, why state both theorems?)
5. Represent $0.\overline{915}$ as a fraction. Show your calculations. Which theorem in the text addresses an expression of this form?

B: Warmup exercises. For you to present in class. Due by end of class Thu., 5 Sep.

2.1.3 Problems: 1, 2, 5, 8

The distribution of various types of numbers

Section 2.1.4

A: Reading questions. Due by 3pm, Mon., 9 Sep.

1. "Question 1" on p. 41 is answered at the end of the section on p. 47. Which number is the irrational one? How do you know it's irrational?
2. Give an example of a number that is algebraic but not rational. How do you know it is algebraic? How do you know it is not rational?
3. What is a transcendental number? Give two examples. (You don't have to prove your answer is correct, but you can give a reference from the text.)
4. What does it mean for a set to be countable? Give an example of a set that is not countable, and an example of a set that is countably infinite. (Don't use the examples in the following Reading Question.)
5. The rational numbers are countably infinite, and the real numbers are not countable. What does this mean about how likely you are to get a rational number if you pick a real number at random? Are there more rational numbers or more irrational numbers?

B: Warmup exercises. For you to present in class. Due by the end of class Tue., 10 Sep.

2.1.4 Problems: 1, 2, 3, 4, 5ab, 8a