1. Make up a five-digit number N that has all different digits.

    (a) Find the base 8 representation of N.

    (b) Interpret your answer to get the number that you started with.

2. Find a pair of positive irrational numbers whose sum is 0.1.

3. Repeating Decimals. For each repeating decimal, use the 'kill the tail' algorithm discussed in class to find a pair of integers m, n such that m/n is the given number.

    (a) $2.3454545\ldots = 2.3\overline{45}$

    (b) $7.11\overline{311}$

    (c) $3.14\overline{9}$

4. Find the remainder when the Fibonacci Number F_{2006} is divided by 9.

5. Use the Euclidean algorithm to solve the decanting problem for decanters of sizes 315 and 319. In other words, find integers x and y such that $gcd(315, 319) = 315x + 319y$. Then explain how this solves the decanting problem. Repeat this process for each of the pairs B. $222, 227$ and C. $213, 231$.

6. Find three decimal digits a, b and c such that the sum of the two three-digit numbers $\underline{abc}$ and $\underline{cab}$ is 864.