

Problem Set 1

1. Suppose it's 3 p.m., and a friend says he'll meet you in 113 hours. What time of day does he want to meet? How many days later?
2. How many times does 17 go into 10,000,000,000,000 evenly? What is $10,000,000,000,000 \bmod 17$?
3. Suppose we've carried out long division of $1/17$ to 13 places: 0.0588235294117. What is the remainder at that point?
4. What is the decimal for $1/17$ to 20 places?
5. Does the decimal for $1/47$ repeat every 46 places, or sooner?
6. Does the decimal for $1/97$ repeat every 96 places, or sooner?
7. Show that $341_{10} = 101010101_2$. Given that $(2^{340} - 1)$ is 340 bits of all 1's in base 2, show that $(2^{340} - 1)/341 = 110000000011000000001100000000 \cdots 110000000011_2$ (332 bits).