Math 110, Spring 2016
HWK03 due Feb 10

1. Compute these sums:

   (a) $\displaystyle\sum_{n=0}^{14} 101 + 2n$

   (b) $\displaystyle\sum_{k=1}^{5} \left(\frac{2}{5}\right)^k$

   (c) $\displaystyle\sum_{j=0}^{6} 5M \cdot 2^{-j}$

2. Sum these infinite geometric series and simplify your answer as much as possible.

(a) $\displaystyle\sum_{n=0}^{\infty}(1-x)^n$

(b) $x - xy + xy^2 - xy^3 + \cdots$

(c) $1 + \sqrt{\dfrac{1}{2}} + \dfrac{1}{2} + \cdots$

(d) $\displaystyle\sum_{j=1}^{\infty} M^2 \sin(kT)\sqrt{2\pi}^{j} e^{1-3j}$

Hint: lots of stuff does not depend on the index of summation, j.

3. Write these sums in Sigma notation, then compute the sum.

(a) $\dfrac{2j}{k} + \dfrac{2j+3k}{k} + \dfrac{2j+6k}{k} + \cdots + \dfrac{2j+321k}{k}$

(b) $3 + \dfrac{1}{4} + \dfrac{1}{48} + \dfrac{1}{12 \cdot 48} + \cdots$

(c) $\dfrac{5}{6} - \dfrac{25}{36} + \dfrac{125}{216} - \dfrac{625}{1296} + \cdots$

4. You and I take turns flipping a fair coin. The first to get a HEADS wins. If you get to go first, what is your probability of winning?

5. What if there are 3 of us playing the same game; if you are going first, what is the probability that you get a HEADS before anyone else?

6. Use integrals to find upper and lower bounds for this sum.

$$\sum_{n=1}^{8000} \frac{1}{\sqrt[3]{n}}$$