Directions: MAKE SURE TO COPY YOUR ANSWERS TO A SEPARATE SHEET FOR SENDING ME AN ELECTRONIC COPY LATER.

1. (10) Suppose $X$ is the length of a random rod, in inches, and $\text{Var}(X) = 2.6$. Let $Y$ denote the length in feet. Find $\text{Var}(Y)$.

2. (10) In the board game, Sec. 2.11, suppose we start at square 3 (no bonus, since we start there rather than landing there). Let $X$ denote the square we land on after one turn. Find $EX$.

3. This problem concerns the Monty Hall example, pp.40ff.
   
   (a) (15) Give the numbers of the “mailing tubes” in (3.1) and (3.2), respectively. Use a comma and/or spaces to separate the two equation numbers, e.g. “(2.1) (2.3)”.
   
   (b) (15) Consider (3.1). Say we change the left-hand side to $P(A = 2 \mid C = 2, H = 1)$. What would be the new numerical value of the numerator on the right-hand side?

4. (20) Look at the simulation code on p.26. Say we wish to find the expected value of $S^2$, where $S$ is the sum of the $d$ dice. Give a line of code, to replace line 11.

5. Consider the Preferential Attachment Graph model, Sec. 2.13.1.
   
   (a) (10) Give the number of the “mailing tube” justifying (2.69).
   
   (b) (10) Find $P(N_3 = 1 \mid N_4 = 1)$.
   
   (c) (10) Find $P(N_4 = 3)$. 
Solutions:

1. 
\[ \left( \frac{1}{12} \right)^2 \cdot 2.6 \]

2. 
\[ 4 \cdot \frac{1}{6} + 5 \cdot \frac{1}{6} + 6 \cdot \frac{1}{6} + 7 \cdot \frac{1}{6} + 0 \cdot \frac{1}{6} + 1 \cdot \frac{1}{6} \]

3.a (2.8), (2.7)  
3.b  
\[ \left( \frac{1}{3} \right) \left( \frac{1}{3} \right) \left( \frac{1}{2} \right) \]

4. 
\[ \text{mean} \left( \text{sums}^{-2} \right) \]

5.a (2.2)  
5.b  
\[ \frac{(1/2)(2/4)}{(1/2)(2/4) + (1/2)(1/4)} \]

5.c  
\[ (1/2)(1/4) + (1/2)(1/4) \]