1. Pg 98: 1.1. \[ p(k) = \begin{cases} 1/6 & \text{if } k = 0 \\ 12 - 2k & \text{if } 1 \leq k \leq 5 \end{cases} \]

2. 1.4. \[ \Pr(Y = k) = \Pr(k \leq X < k + 1) = e^{-\lambda k}(1 - e^{-\lambda}). \]

3. 1.5 Differentiate wrt p, and find \( p = k/n \) is unique critical point. Checking the endpoints to ensure the max occurs there.

4. 1.8. \( n = 20, p = \frac{1}{50}, \lambda = np = 2/5 \). Poiss. approx. gives \[ \Pr(\text{no three of a kind}) \approx e^{-2/5} \approx 0.6703. \]

5. 1.14. \( n = 3000, p = 1/1000, \lambda = np = 3 \). Answer \( \approx e^{-3}(1 + 3 + 9/2) \).

6. Section 4.1. 1.2. Let \( x \) be am’t you should pay him for winning a $1 bet and \( X \) be gambler’s net income after one roll. Check \( E(X) = 0 \) to get \( x = 5 \).

7. 1.6. \[ \Pr(2 \text{ of her numbers are picked}) = \binom{3}{2} \binom{73}{18} \frac{80}{20} \binom{20}{20} \] \[ \Pr(3 \text{ of her numbers are picked}) = \binom{3}{3} \binom{73}{17} \frac{80}{20} \binom{20}{20} \] So, her expected winnings = \( 6 \frac{80}{20} \binom{20}{20} + 26 \frac{80}{20} \binom{20}{20} \)

8. 1.10. Let \( X \) be the number of days we have to wait until at least one kite flies. \( X \) has a geometric distribution with success probability 7/15. So, \( E(X) = 15/7 \).