Assignment: Probability Situations

1. There are 4 green smarties and 2 yellow smarties in a box. Maggie and Robin take one at a time without looking, Maggie going first. Whoever gets a colour that the other person has already chosen, gets to eat the smarties. What is the probability that Maggie will eat the smarties? $\left[\frac{1}{3}\right]$

2. What is the probability of getting all six faces in 6 rolls of a die? [1.54%]

3. Three dice are rolled together. Find the probability of getting:
    a. Tripe-6 [0.463%]
    b. Any triple [2.78%]
    c. Three different numbers [55.6%]
    d. A sum of 10 [12.5%]
    e. A sum of 14 [6.94%]
    f. An odd sum [0.5]
    g. An even sum [0.5]
    h. An odd product [12.5%]
    i. An even product [87.5%]
    j. At least one 6 [42.1%]
    k. Exactly two alike $\left[\frac{5}{12}\right]$
    l. Exactly two even numbers [37.5%]

4. When rolling a die,
    a. What is the probability of getting a 6 within the first two rolls? [30.6%]
    b. How many rolls would you need for the odds of getting a 6 to be in your favour? $[n \geq 4]$

5. When rolling a pair of dice,
    a. What is the probability of getting a rum of 12 within the first 5 rolls? [13.1%]
    b. How many rolls would be needed to obtain favourable odds of getting a sum of 12? $[n \geq 25]$

6. When rolling three dice,
    a. What is the probability of getting a sum of 18 within the first 10 rolls? [4.53%]
    b. How many rolls would you need to obtain favourable odds of getting a sum of 18? $[n \geq 150]$

7. In a 6/49 lottery, the player buys a ticket by choosing 6 numbers from 1 through 49, and can win a prize if her numbers match the official winning numbers, which are drawn randomly. In a 6/49 lottery,
    a. In how many ways can the 6 numbers be chosen? [13983816]
    b. Calculate the probability of matching all 6 of the official numbers (which is called winning the jackpot) $[7.151 \times 10^{-8}\%]$
    c. Calculate the probability of matching 5 of the six official numbers (and one other that is not the winning official number) [0.00184%]
    d. Calculate the probability of matching:
        i. 4 numbers [0.0969%]
        ii. 3 numbers [1.77%]
        iii. 2 numbers [13.24%]
        iv. 1 number [41.30%]
        v. No official numbers [43.60%]

e. Calculate the probability of all six numbers are odd $\left[\frac{25}{1974}\right]$
f. Calculate the probability of all six numbers are even $\left[\frac{19}{1974}\right]$
g. Calculate the probability of at least one number is repeated from last week [56.40%]
h. Calculate the probability of there are no multiples of 5 [27.45%]
i. Calculate the probability of at least one number is greater than 31. [94.73%]
8. This is a poker game involving 7 cards, in which the best 5 cards make up the poker hand.
   a. You are holding ◆King and ◆Queen. There are 5 cards to come. Find the probability of :
       i. Pairing at least one of these [48.74%]
       ii. Pairing both King and Queen [6.46%]
       iii. Getting 3 Kings or 3 Queens[4.57%]
       iv. A full house involving kings and queens but not 4 of a kind (Full House: involving 3 of one kind and 2 of another kind) [0.804%]
       v. A flush in diamonds (flush: 5 cards of the same suit) [6.40%]
       vi. 4 Kings or 4 Queens [0.102%]
   b. You are holding ◆7 and ♣ 7, what is the probability of getting:
       i. Three 7s at least [19.18%]
       ii. Four 7s [0.816%]