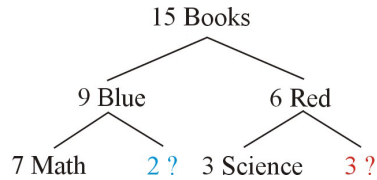


SOLUTIONS - CHAPTER 7 EXERCISES

7.1 First, organize the information you are given:

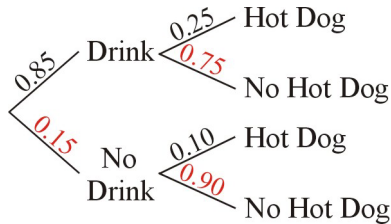


Notice that there are 5 books not accounted for here, but we are told that we have 5 psychology books not in this information. So, there must be 2 blue psychology books and 3 red psychology books.

Therefore, the probability that a psychology book is blue is equal to

$$\frac{\text{Number of blue psychology books}}{\text{Total number of psychology books}} = \frac{2}{5}$$

7.3 First, organize the given information in a tree diagram:



We are looking to find the conditional probability $P(\text{No Drink} | \text{Hot Dog})$, since we know that the spectator bought a hot dog. Using the conditional probability formula,

$$\begin{aligned}
 P(\text{No Drink} | \text{Hot Dog}) &= \frac{P(\text{No Drink} \cap \text{Hot Dog})}{P(\text{Hot Dog})} \\
 &= \frac{P(\text{No Drink} \cap \text{Hot Dog})}{P(\text{Drink} \cap \text{Hot Dog}) + P(\text{No Drink} \cap \text{Hot Dog})} \\
 &= \frac{(0.15)(0.10)}{(0.85)(0.25) + (0.15)(0.10)} \\
 &= \frac{0.015}{0.2275} \\
 &= \frac{6}{91} \approx 0.0659
 \end{aligned}$$

7.5 Let S be the event that Susie wears the shirt to school on Monday and let K be the event that Karen wears the shirt to school on Monday. Then, we are given that

$$P(S) = 0.10 \quad \text{and} \quad P(K) = 0.25$$

We want to find the probability that at least one of the girls wears the shirt to school on Monday, which means we want to find the probability that Susie OR Karen wears the shirt to school on Monday, that is, we want to find $P(S \cup K)$.

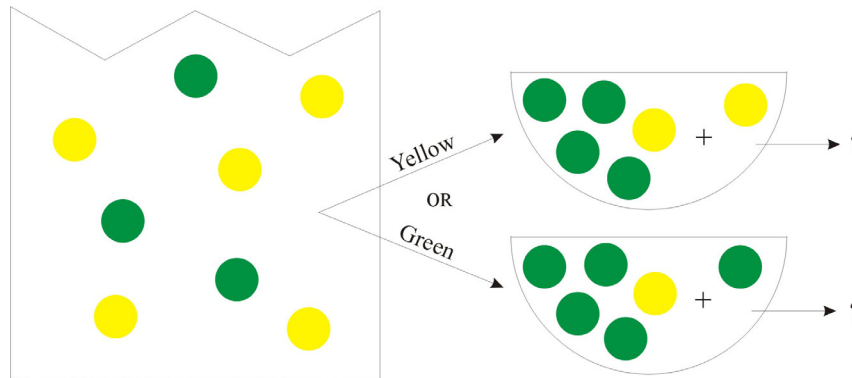
We know that

$$P(S \cup K) = P(S) + P(K) - P(S \cap K)$$

Since the girls make independent decisions, $P(S \cap K) = P(S)P(K)$, and we have

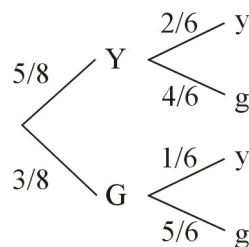
$$\begin{aligned} P(S \cup K) &= P(S) + P(K) - P(S)P(K) \\ &= 0.10 + 0.25 - (0.10)(0.25) \\ &= 0.325 \end{aligned}$$

7.7 The probabilities of drawing from the basket are dependent upon what is drawn from the bag first. Consider the following:



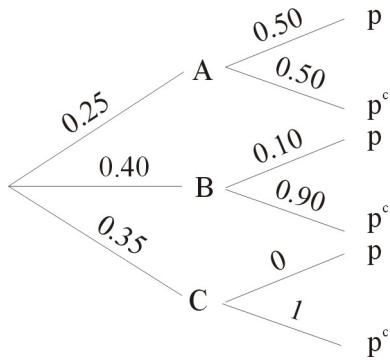
Let Y be the event that a yellow ball is drawn from the bag, let G be the event that a green ball is drawn from the bag, let y be the event that a yellow ball is drawn from the basket, and let g be the event that a green ball is drawn from the basket.

Constructing a tree diagram of the situation, we have



We are looking for the conditional probability, $P(y|Y)$. This is a probability on a branch of the tree diagram, the probability from Y to y , which is equal to $\frac{2/6}{5/8} = \frac{1}{3}$.

7.9 Let A , B , and C , be the events that a t-shirt comes from company A , B , and C , respectively, and let p be the event that a t-shirt has a pocket. We can draw the following tree diagram of the scenario:



We are looking for the probability, $P(p)$. There are three distinct ways for the event p to happen and thus,

$$\begin{aligned}
 P(p) &= P(A \cap p) + P(B \cap p) + P(C \cap p) \\
 &= (0.25)(0.50) + (0.40)(0.10) + (0.35)(0) \\
 &= 0.165
 \end{aligned}$$