

1. As a promotional offer, a newly opened movie theater is awarding 30% of their new patrons with a complimentary dinner, and the rest are given a free drink. To boost their sales of tickets online, they allocated 40% of the complimentary dinners and 60% of the free drinks to tickets that are sold online.
 - a. If a movie-goer purchased their ticket online, what is the probability of them winning a complimentary dinner?
 - b. If a movie-goer did not purchase their ticket online, what is the probability of them winning a free drink?
2. Schnitzler syndrome has an incidence rate of 5%. It is found that 80% of people suffering from Schnitzler syndrome get a positive result from the screening test and 10% of the people without the syndrome get a (false) positive result.
 - a. What is the probability of not having Schnitzler syndrome if the test result was positive?
 - b. What is the probability of having Schnitzler syndrome if the test result was negative?
3. A Sports Academy trains young athletes for international events. 20% of the athletes choose Football, 35% choose Cricket, and the rest choose Tennis. In the last decade, 10% of the footballers, 15% of the cricketers, and 12% of tennis players left the Academy before finishing the course.
 - a. What is the probability of an athlete choosing Tennis and leaving the Academy before finishing the course?
 - b. Determine the probability of a randomly chosen athlete leaving the Academy before finishing the course.

4. A computer dealership that sells laptops with both Intel and AMD chips. On any given day 55% of all the customers ordering a new laptop want one with an AMD chip, while the rest prefer Intel. Suppose 20 customers were randomly selected among those shopping for laptops on a specific day.

a) What is the probability that the number of people who want AMD laptops is more than two standard deviations away from the mean value?

b) SwiftTech has 10 AMD laptops and 15 Intel laptops in stock. If 20 people come in one after another to purchase a laptop, what is the probability that all 20 will get the type of laptop they want?

c. From studies, it was found that 60% of the people prefer Sprite, while the rest prefer Coca-Cola. A sample of 16 customers were randomly selected to test the preference of drinks.

a. What is the probability that the number of people who prefer Sprite is more than two standard deviations away from the mean value?

$$P(X < \mu - 2\sigma \text{ and } X > \mu + 2\sigma) \text{ or } (1 - P(\mu - 2\sigma \leq X \leq \mu + 2\sigma))$$

b. The store only has 12 bottles of Sprite and 7 bottles of Coca-Cola in stock. If the 16 people place their order one after the other, what is the probability that all of them will be able to buy the drink they prefer?

$$P(9 \leq X \leq 12)$$

