

1. An octave contains twelve different musical notes (in Western music). How many different eight note melodies can be constructed from these twelve notes if:
 - (a) no note can be used more than once?
 - (b) any note can be used as often as you please?
2. A certain pizza restaurant offers three different sizes of pizza and eight different toppings. How many distinct pizzas having two different toppings can be made?
3. The chance that Ariel sees the movie *Norbit* is 45%. The chance that Brandon sees the movie is 50%. The chance that Ariel and Brandon both see the movie is 30%.
 - (a) If Brandon sees the movie, what is the chance that Ariel also sees it?
 - (b) Are the events “Ariel sees the movie” and “Brandon sees the movie” independent? Justify your answer with a calculation.
4. In a certain election, the incumbent Republican will run against the Democratic nominee. There are three Democratic candidates, D_1 , D_2 and D_3 , whose chances of gaining the Democratic nomination are .50, .35 and .15, respectively. Here are the chances that the Republican will win against each of these possible Democratic nominees:
$$\text{vs. } D_1: 0.60 \quad \text{vs. } D_2: 0.50 \quad \text{vs. } D_3: 0.40$$
 - (a) Name (but do not give) the probability formula that is needed to find the chance that the Republican will win the election.
 - (b) Find the probability that the Republican will win the election.
5. Widgets are produced at a certain factory by each of three machines A, B and C. These machines produce 1000, 600 and 400 widgets per day, respectively. The probability that a given widget is defective is 4% for one produced by Machine A, 3% if produced by Machine B, and 2% if produced by Machine C. Suppose that the Widget Inspector selects a widget at random from the factory's widget inventory.
 - (a) What is the probability that the widget is defective?
 - (b) If the widget is defective, what is the chance that it came from Machine A?
6. A fair coin is flipped three times. You win \$5 every time the outcome is heads. Let the random variable X represent the total number of dollars you win.
 - (a) List the sample space.
 - (b) Determine the probability function of X .
7. Suppose that there are nine adjacent parking spaces in one row of a parking lot. Nine cars are to be parked by an attendant. Three are SUV's, three are compacts, and three are expensive sports cars. Assuming that the attendant parks the cars randomly, find the chance that the three expensive sports cars are parked next to one another.