

1. A quality control inspector test mechanical toys and evaluates each one as acceptable or defective. She evaluates toys one after another. Testing stops as soon as one defective toy is found, or until 6 toys are evaluated. How many outcomes in this sample space?
2. A box contains 3 red, 1 white and 2 blue balls. An experiment consists of drawing balls in succession without replacement, and noting the color of each until a red ball is drawn . Draw the tree diagram and find how many outcomes in the sample space.
3. You have a dime, 2 nickels, and a penny in your pocket. You reach into your pocket, remove a coin and you continue to do this until you get the penny (you do not replace coins once you remove them from your pocket). Once you get the penny, you add the value of the coins you have taken out of your pocket. How many different sums are possible?
4. A part-time secretary works 20 hours each week typing reports and surveys. A report requires 5 hours of typing; a survey requires 10 hours. Use the tree diagram to find the ways in which the work for a week can be organized so exactly 20 hours is used.

Answers #1-4 (not in order): 9 outcomes ; 5 outcomes ; 7 outcomes ; 5 outcomes

5. A college student is planning a trip to Europe. She will visit Spain, France, England, Ireland, and Germany. Due to travel constraints, she must visit France and Spain one immediately after the other, in either order. How many different itineraries can she plan?
6. Five married couples (10 people total) attend a theater event, and are to sit in a row. In how many ways can they sit if each person must sit next to their own spouse?
7. Five cars to be sold in an auction among 8 car dealers. In how many different ways can this be done if:
 - a) there are no restrictions (one dealer can buy more than one car)
 - b) no dealer can buy more than one car.
8. A car holds 3 people in the front and 3 people in the back. In how many ways 6 people can be seated in the car? if a given couple must sit together?
9. There are 5 rooms available in a motel. Room A, B and C are reserved for men only, room D and E are reserved for women only. A group of 6 women and 8 men are trying to rent those rooms in which only one person can be assigned to each room:
 - a) in how many different ways those rooms can be assigned?
 - b) if Tom is the leader of the group and he must be included in any choice, how many different ways this can be done?
10. A certain test has 5 multiple choice questions with 4 choices each, followed by 10 true/false questions. An answer sheet consists of one answer to each question. In how many different ways could you fill in the answer sheet

Answers #5 - 10 (not in order):

$[4^5 \cdot 2^{10}]$; $[48]$; $[a. 10080 \quad b. 3780]$; $[P(6,6) ; 4 \cdot 2 \cdot P(4,4)]$; $[a. 8^5 \quad b. 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4]$; $[3840]$

11. A box contains 10 red balls and 8 blue balls. How many ways can 6 balls be selected so that both red and blue balls are obtained?
12. A box contains 10 red balls, 8 blue balls and 6 white balls. How many ways can 6 balls be selected so that at least one is white?
13. A motor pool contains 5 cars, 4 station wagons, and 3 vans. How many ways can 3 vehicles be selected so that more than one type of vehicle is represented?
14. Five people applied for 2 departments: sale and management,
 - a) If 3 are selected for sale and 2 for management, how many ways can this assignment be made?
 - b) If each department must have at least 1 people assigned to it, how many assignments are there?
15. How many different numbers between 10 and 999 can be formed with the digits in the set: {1,2,3,4,5,6,7,8,9}
 - a) if no digit is repeated in any number?
 - b) if digits can be repeated?

*Answers #11 - 15 (not in order): [18326] ; [a. $C(5,3)$ b. 30] ; [205] ;
 $[C(24,6) - C(18,6)]$; [a. $72 + 504 = 576$ b. $81 + 729 = 810$]*

16. * How many different even numbers between 10 and 500 can be formed with the digits in the set: {1,2,4,6,7,8} if no digit is repeated in any number?
 (Answer: $20 + 40 = 60$)
17. In a bag there are 8 yellow, 10 red and 12 purple marbles. In how many ways can 5 marbles be randomly selected, without replacement, from the bag if the selection shows:
 - a) all 5 marbles are of the same color?
 - b) the selected marbles have more than one color?
 - c) At least 1 yellow
 (Answer: a. 1100 b. 141,406 c. 116,172)
18. The Mass lottery involves selecting 6-numbers out-of-46 numbers (1,2,3,4,...45,46). In how many ways this can be created:
 - a) getting the correct 6 numbers?
 - b) getting 4 correct numbers?
 - c) getting 0 correct numbers?
 (Answer: a. 1 b. 11700 c. 3,838,380)
19. Two cards are selected from a deck of 52 cards. In how many different ways this can be done so :
 - a) they are same color
 - b) they are a pair of kings
 - c) they are a pair
 (Answer: a. 650 b. 6 c. 78)
20. Five cards are selected from a deck of 52 cards. In how many different ways this can be done so :
 - a) they must have both colors (more than one color)?
 - b) they must be of the same suit?
 - c) they must include more than one suits?
 - *d) they must include all suits?
 (Answer: a. 2467400 b. 5148 c. 2593812 d. 685464)