

## General Education Mathematics

### Geometry 1

Part 1.: [Standard labeling, Sides and Angles](#)

Part 2: [The sum of the Inner Angles of triangles.](#)

Part 3. [Angles of Polygons](#)

[Introduction to Set Theory](#)

[More Set Operations](#)

[Introduction to Combinatorics](#)

[Fundamental Counting Principle and Permutations](#)

[Listing and Counting Subsets](#)

[More Listing](#)

[Introduction to Probabilities](#)

[Combinations](#)

1. Suppose that  $U = \{1, 2, 3, \dots, 12\}$ ,  $A = \{1, 2, 3, 7, 8\}$ ,  $B = \{3, 4, 5, 7, 8, 12\}$ , and  $C = \{2, 3, 4, 6, 7, 11, 12\}$ . Find each of the given sets.
  - a)  $(A \cup B) \setminus C$
  - b)  $A \cup (B \setminus C)$       [Solution](#)
2. 12 women and 8 men will compete in a race. What is the probability that the first three finishers are
  - a) all men
  - b) 2 men and 1 woman?      [Solution](#)
3. We toss a coin ten times. What is the probability that the results will be
  - a) exactly 3 heads
  - b) at least 3 heads? [Solution](#)
4. There are 7 blue and 3 red marbles in a bag. We randomly pull two marbles, with replacement. Find each of the probabilities.
  - a) Both marbles pulled are blue..
  - b) Both marbles pulled are red.
  - d) The marbles we pulled have the same color.
  - e) The marbles we pulled are of different colors.
  - f) g) h) i) Find the same probabilities if there is no replacement.      [Solution](#)
5. There are 18 marbles in a bag: 6 red, 4 green, and 8 blue. We randomly pull three marbles. Find each of the following probabilities with replacement:
  - a) We pull 3 red marbles.
  - b) We pull 3 marbles of the same color.
  - c) We pull three marbles, all different colors.
  - d) e) f) Find the same probabilities if there is no replacement.      [Solution](#)

6. There are 16 red and 4 blue marbles in a bag. We randomly pull two marbles. If both are red, we win \$1. If both blue, we win \$4. Otherwise, we lose \$2. What is the expected value of this game for us, with and without replacement? [Solution](#)
7. We roll a fair die. If we roll  $x$  and  $x$  is odd, we win the square of  $x$  in dollars. If  $x$  is even, we win the square of  $x$  in dollars. What is the expected value of this game for us? [Solution](#)
8. There are 12 marbles in a bag. We randomly pull a marble. If it is red, we win \$8. If it is blue, we lose \$7. How many red marbles are in the bag if the expected value of this game for us is  $-0.75$  dollars? [Solution](#)
9. We roll two dice. If the numbers rolled are different, we pay 2 dollars. If we roll the same number, then we will win the sum of the number rolled (i.e if we roll a 5 and a 5, we win \$10). What is the expected value of this game for us? [Solution](#)
10. Find the present value of the following three payments: \$1400 today, \$1400 a year from today, and \$1400 two years from today. Assume an annual compound interest rate of 6%, compounded monthly. [Solution](#)