# [probability]

1. A die is tossed 30 times. Determine the probability that an even number will turn up exactly 12 times. Use 3 decimal places in your answer.
2. A game is played by rolling two dice. If the sum of the dice is either a 3 or 10, you win $1.50. If it is an 8, you win $3.00 and if it is a 2 you win $5.00.
   a. If you pay $1.00 to play this game, is it fair? Show your work and explain your conclusion.
   b. What would you expect to win/lose in 25 games?
3. The probability of a person correctly distinguishing between two similar objects on a visual examination is 0.73. If 11 peopl take the exam, what is the probability that:
   a. Exactly 5 distinguish between the 2 objects.
   b. Less than 2 distinguish between the 2 objects.
4. An international committee to discuss trade between Canada and the U.S. is to be created. The committee to contain four people chosen randomly from a select group of three Canadians and four Americans.
   a. Show the probability distribution in table form for the number of Canadians on the committee in table form.
   b. Determine the expected number of Canadians.
5. There are 3 cows ill in a herd of 20. Six are randomly tested for the illness. If none of the cows tested are ill, then the herd is sent to market. Determine the probability of the herd going to market.
6. A game consists of cutting a shuffled deck of cards. If you cut a black card, 10 you win $0.45. If you cut a King or Queen, you win $0.30. If you cut anything less than a seven, then you lose $0.10. Determine the expectation for this game, in **cents**, to one decimal place. (Ace is high.)
7. A pair of 12 sided dice are rolled 20 times.
   a. Determine the probability that double 3's are rolled exactly three times. (5 decimal places)
   b. Determine the probability that at least 2 double 5's are rolled. (4 decimals)
8. If you select a number from 1 – 1000 inclusive, what is the probability that it is NOT DIVISIBLE by 2, 3, or 5?
9. There are 20 000 eligible voters in a riding. Suppose 6 000 of these voters support the Liberal party. If we take a sample of 500 voters, determine the **probability function** for the number of Liberal supporters in the sample.
10. Insulators for transformers are purchased in cases of 10. From the case, 4 insulators are sampled and inspected. If the sample contains one or more defective insulators, the whole case is sent back to the supplier. Suppose the case contains 3 defective insulators, what is the probability that the case will be returned?

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11. A basketball player is in the process of shooting two foul shots. If her probability of success on each shot is 0.7, determine the number of points she is expected to score if each foul shot made is worth 1 point.

12. Three marbles are drawn from a bag that contains five blue and four yellow marbles.
    a. Draw a probability graph showing the distribution of the number of blue marbles that can be drawn and their probabilities.
    b. Determine the expected number of blue drawn.

13. In a jar of 100 jellybeans, there are 80 green and 20 yellow jellybeans. A handful of 5 jellybeans is selected at random. Determine the probability that there are exactly 3 green in this selection.

14. On a TV news show, the station manager estimates that the probability that a caller will give the correct answer to the evening news trivia question is 0.32.
    a. Determine the probability that the fourth caller is the winner.
    b. What is the expected number of calls before a winner is found?

15. In a survey on the use of illicit drugs, a random sample of 100 teenagers is chosen from an estimated population of 2 000. If an estimated 40% of the teenagers in the population have used illicit drugs, determine the probability that the sample of 100 will contain at least 4 who have used illicit drugs.

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