

1. A candy dish contains three red candies, 4 yellow candies and 5 blue candies. You close your eyes, choose two candies one at a time (without replacement) from the dish, and record their colors.

(a) Find the probability that both candies are red. (a) _____

(b) Find the probability that both candies are not blue.
(b) _____

2. The proportions of blood phenotypes A, B, AB and O in the population of all Caucasians in the U.S. are reported at 0.41, 0.10, 0.04 and 0.45, respectively. An individual is randomly selected from the population. Find the probability that the person will have either type A or type AB blood.

2. _____

3. Toss three fair coins. Find the probability that all three are tails.

4. In a genetics experiment, the researcher mated two *Drosophila* fruit flies and observed the traits of 300 offspring. The results are shown in the table.

Eye Color	Wing Size	
	Normal	Miniature
Normal	140	6
Vermillion	3	151

One of these offspring is randomly selected and observed for the two genetic traits.

- (a) Find the probability that the fly has normal eye color and normal wing size.

(a) _____

- (b) Find the probability that the fly has vermillion eyes.

(b) _____

- (c) Find the probability that the fly has either vermillion eyes or miniature wings.

(c) _____

- (d) Find the probability that the fly has miniature wings given that its eye color is normal.

(d) _____

5. Two cards are drawn from a standard deck of cards, one at a time (with replacement). Find the probability that the draw includes an ace and a ten.

6. Two cards are drawn from a standard deck of cards, one at a time (without replacement). Find the probability that the draw includes an ace and a ten.

7. Suppose that $P(A) = 0.3$ and $P(B) = 0.5$. If events A and B are disjoint events, find these probabilities:

(a) $P(A \text{ and } B)$ (a) _____

(b) $P(A \text{ or } B)$ (b) _____

8. Suppose that $P(A) = 0.4$ and $P(B) = 0.2$. If events A and B are independent, find these probabilities:

(a) $P(A \text{ and } B)$ (a) _____

(b) $P(A \text{ or } B)$ (b) _____

9. A slot machine has three machine wheels that spin independently. Each has 12 equally likely symbols: 4 bars, 3 lemons and 3 cherries and two bells. If you play, what is the probability that

(a) you get 3 cherries? (a) _____

(b) you get no fruit symbols? (b) _____

(c) you get 3 bell symbols? (c) _____

10. You bought a new set of four tires from a manufacturer who just announced a recall because 2.5% of those tires are defective. What is the probability that at least one of yours is defective?

10. _____

11. Voter Support for political term limits is strong in many parts of the U.S. A poll conducted by the Field Institute in California showed support for term limits by a 2–1 margin. The results of this poll of $n = 347$ registered voters are given in the table.

	For (F)	Against (A)	No Opinion (N)	Total
Republican (R)	0.28	0.10	0.02	0.40
Democrat (D)	0.31	0.16	0.03	0.50
Other	0.06	0.04	0.00	0.10
Total	0.65	0.30	0.05	1.00

If one individual is drawn at random from this group of 347 people, calculate the following probabilities:

- (a) $P(R)$ (a) _____
- (b) $P(F|R)$ (b) _____
- (c) $P(D|A)$ (c) _____
- (d) $P(F)$ (d) _____
- (e) $P(R \text{ or } F)$ (e) _____

12. Find the expected value and standard deviation of the following probability model.

X	3	5	7
$P(X)$	0.25	0.35	0.40

12. _____

13. An insurance policy costs \$100 and will pay policy holders \$10,000 if they suffer a major injury (resulting in hospitalization) or \$3000 if they suffer a minor injury (resulting in lost time for work). The company estimates that each year 1 in every 2000 policy holders have a major injury, and 1 in 500 a minor injury.

(a) Create a probability model for the profit on a policy.

(b) Find the expected value on this policy. (b) _____

(c) Find the standard deviation. (c) _____

14. Assume that a procedure yields a binomial probability model with a trial repeated $n = 5$ times. Suppose the probability of success on a single trial is $p = 0.47$. Then X counts the number of successes among 5 trials. Describe the distribution (probability model) by filling out the table below. Round calculations to three decimal places.

x	$P(X = x)$
0	
1	
2	
3	
4	
5	

15. College campuses are graying! According to a recent article, one in four college students is age 30 or older. Many of these students are women updating their job skills. Assume that the 25% figure is accurate, that your college is representative of colleges at large, and that you sample $n = 200$ students, recording X , the number of students age 30 or older. What are the mean and standard deviation of X ?

15. _____

16. Assume that 13% of people are left-handed. If we select 5 people at random, find the probability of each outcome described below.

(a) The first lefty is the fifth person chosen. (a) _____

(b) There are some lefties in the group of 5 people. (b) _____

(c) The first lefty is the second or third person chosen. (c) _____

(d) There are exactly 3 lefties in the group. (d) _____

(e) There are no more than 3 lefties in the group. (e) _____

17. Suppose a certain tennis player makes a successful first serve 70% of the time. Assume that each serve is independent of the others. If she serves 100 times in a match, find the following.
- (a) What are the mean and standard deviation of the good first serves expected?
 - (b) Verify that you can use a Normal model to approximate the distribution of the number of good first serves.
 - (c) Use the 68–95–99.7 Rule to describe the distribution.
 - (d) Using the Normal Model, what's the probability she makes at least 65 first serves?
 - (e) Using the Normal Model, what's the probability she makes not more than 75 first serves?
 - (f) Using the Normal Model, what's the probability she makes between 63 and 72 first serves?