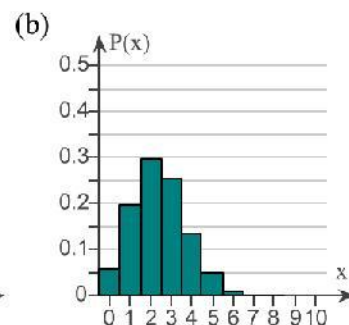
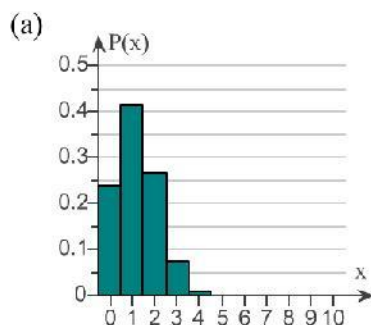


1. The histograms each represent part of a binomial distribution. Each distribution has the same probability of success, p , but different numbers of trials, n . Identify the unusual values of x in each histogram.

- (a) $n = 4$
(b) $n = 8$



(a) Choose the correct answer below. Use histogram (a).

- ☐ A. $x = 5$, $x = 6$, $x = 7$, and $x = 8$
- ☐ B. $x = 1$
- ☐ C. $x = 4$
- ☐ D. There are no unusual values of x in the histogram.

(b) Choose the correct answer below. Use histogram (b).

- ☐ A. $x = 4$
- ☐ B. $x = 5$, $x = 6$, $x = 7$, and $x = 8$
- ☐ C. $x = 2$
- ☐ D. There are no unusual values of x in the histogram.

2. About 10% of babies born with a certain ailment recover fully. A hospital is caring for six babies born with this ailment. The random variable represents the number of babies that recover fully. Decide whether the experiment is a binomial experiment. If it is, identify a success, specify the values of n , p , and q , and list the possible values of the random variable x .

Is the experiment a binomial experiment?

- ☐ Yes
☐ No

What is a success in this experiment?

- ☐ This is not a binomial experiment.
☐ Baby recovers
☐ Baby doesn't recover

Specify the value of n . Select the correct choice below and fill in any answer boxes in your choice.

- ☐ A. $n =$
☐ B. This is not a binomial experiment.

Specify the value of p . Select the correct choice below and fill in any answer boxes in your choice.

- ☐ A. $p =$
☐ B. This is not a binomial experiment.

Specify the value of q . Select the correct choice below and fill in any answer boxes in your choice.

- ☐ A. $q =$
☐ B. This is not a binomial experiment.

List the possible values of the random variable x .

2.

(cont.)

- ☐ $x = 0, 1, 2, \dots, 5$
 - ☐ $x = 1, 2, 3, \dots, 6$
 - ☐ $x = 0, 1, 2, \dots, 6$
 - ☐ This is not a binomial experiment.
-

3.

Find the mean, variance, and standard deviation of the binomial distribution with the given values of n and p .

$$n = 121, p = 0.56$$

The mean, μ , is . (Round to the nearest tenth as needed.)

The variance, σ^2 , is . (Round to the nearest tenth as needed.)

The standard deviation, σ , is . (Round to the nearest tenth as needed.)

4.

63% of men consider themselves professional baseball fans. You randomly select 10 men and ask each if he considers himself a professional baseball fan. Find the probability that the number who consider themselves baseball fans is (a) exactly eight, (b) at least eight, and (c) less than eight. If convenient, use technology to find the probabilities.

(a) $P(8) =$ (Round to the nearest thousandth as needed.)

(b) $P(x \geq 8) =$ (Round to the nearest thousandth as needed.)

(c) $P(x < 8) =$ (Round to the nearest thousandth as needed.)

5. Forty percent of households say they would feel secure if they had \$50,000 in savings. You randomly select 8 households and ask them if they would feel secure if they had \$50,000 in savings. Find the probability that the number that say they would feel secure is (a) exactly five, (b) more than five, and (c) at most five.
-

(a) Find the probability that the number that say they would feel secure is exactly five.

$$P(5) = \square$$

(Round to three decimal places as needed.)

(b) Find the probability that the number that say they would feel secure is more than five.

$$P(x > 5) = \square$$

(Round to three decimal places as needed.)

(c) Find the probability that the number that say they would feel secure is at most five.

$$P(x \leq 5) = \square$$

(Round to three decimal places as needed.)

6. 31% of adults say cashews are their favorite kind of nut. You randomly select 12 adults and ask each to name his or her favorite nut. Find the probability that the number who say cashews are their favorite nut is (a) exactly three, (b) at least four, and (c) at most two. If convenient, use technology to find the probabilities.
-

(a) $P(3) = \square$ (Round to the nearest thousandth as needed.)

(b) $P(x \geq 4) = \square$ (Round to the nearest thousandth as needed.)

(c) $P(x \leq 2) = \square$ (Round to the nearest thousandth as needed.)

7. 22% of college students say they use credit cards because of the rewards program. You randomly select 10 college students and ask each to name the reason he or she uses credit cards. Find the probability that the number of college students who say they use credit cards because of the rewards program is (a) exactly two, (b) more than two, and (c) between two and five inclusive. If convenient, use technology to find the probabilities.
-

(a) $P(2) = \square$ (Round to the nearest thousandth as needed.)

(b) $P(x > 2) = \square$ (Round to the nearest thousandth as needed.)

(c) $P(2 \leq x \leq 5) = \square$ (Round to the nearest thousandth as needed.)

8. 36% of women consider themselves fans of professional baseball. You randomly select six women and ask each if she considers herself a fan of professional baseball.

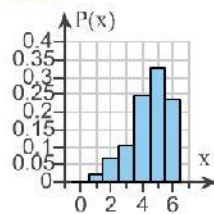
(a) Construct a binomial distribution using $n = 6$ and $p = 0.36$.

x	P(x)
0	
1	
2	
3	
4	
5	
6	

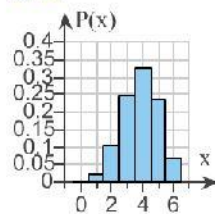
(Round to the nearest thousandth as needed.)

(b) Choose the correct histogram for this distribution below.

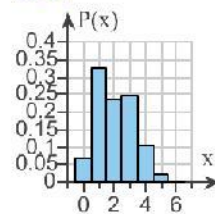
☐ A.



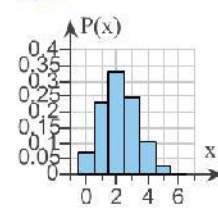
☐ B.



☐ C.



☐ D.



(c) Describe the shape of the histogram.

- ☐ A. Skewed left
☐ B. Skewed right
☐ C. Symmetrical
☐ D. None of these

(d) Find the mean of the binomial distribution.

$\mu =$ (Round to the nearest tenth as needed.)

8. (c) Find the variance of the binomial distribution.

(cont.)

$$\sigma^2 = \boxed{} \text{ (Round to the nearest tenth as needed.)}$$

(f) Find the standard deviation of the binomial distribution.

$$\sigma = \boxed{} \text{ (Round to the nearest tenth as needed.)}$$

(g) Interpret the results in the context of the real-life situation. What values of the random variable would you consider unusual? Explain your reasoning.

On average, $\boxed{}$ out of 6 women would consider themselves baseball fans, with a standard deviation of $\boxed{}$ women. The values $x = 6$ and $x = \boxed{}$ would be unusual

because their probabilities are

less than
more than
equal to

0.05.

9. Given that x has a Poisson distribution with $\mu = 5$, what is the probability that $x = 0$?

$$P(0) \approx \boxed{} \text{ (Round to four decimal places as needed.)}$$

10. Given that x has a Poisson distribution with $\mu = 1.8$, what is the probability that $x = 5$?

$$P(5) \approx \boxed{} \text{ (Round to four decimal places as needed.)}$$

11. Decide which probability distribution — binomial, geometric, or Poisson — applies to the question. You do not need to answer the question.

Given: Of students ages 16 to 18 with A or B averages who plan to attend college after graduation, 70% cheated to get higher grades. Ten randomly chosen students with A or B to attend college after graduation were asked if they cheated to get higher grades. *Question:* What is the probability that exactly two students answered no?

What type of distribution applies to the given question?

- ☐ A. Poisson distribution
- ☐ B. Geometric distribution
- ☐ C. Binomial distribution

-
12. Decide which probability distribution — binomial, geometric, or Poisson — applies to the question. You do not need to answer the question. Instead, justify your choice.

Given: The mean number of oil tankers at a port city is 10 per day. The port has facilities to handle up to 15 oil tankers in a day.

Question: What is the probability that too many tankers will arrive on a given day?

Choose the correct probability distribution below.

- ☐ A. Binomial. You are interested in counting the number of successes out of n trials.
- ☐ B. Geometric. You are interested in counting the number of trials until the first success.
- ☐ C. Poisson. You are interested in counting the number of occurrences that take place within a given unit of time.
-

13. Find the indicated probabilities using the geometric distribution or Poisson distribution. Then determine if the events are unusual. If convenient, use a Poisson probability table or technology to find the probabilities.

Assume the probability that you will make a sale on any given telephone call is 0.18. Find the probability that you (a) make your first sale on the fifth call, (b) make your sale on the first, second, or third call, and (c) do not make a sale on the first three calls.

(a) $P(\text{make your first sale on the fifth call}) = \square$

(Round to three decimal places as needed.)

(b) $P(\text{make your sale on the first, second, or third call}) = \square$

(Round to three decimal places as needed.)

(c) $P(\text{do not make a sale on the first three calls}) = \square$

(Round to three decimal places as needed.)

Which of the events are unusual? Select all that apply.

- ☐ A. The event in part (a), "make your first sale on the fifth call", is unusual.
- ☐ B. The event in part (b), "make your sale on the first, second, or third call", is unusual.
- ☐ C. The event in part (c), "do not make a sale on the first three calls", is unusual.
- ☐ D. None of the events are unusual.
-

14. Find the indicated probabilities using the geometric distribution or Poisson distribution. Then determine if the events are unusual. If convenient, use a Poisson probability table or technology to find the probabilities.

A newspaper finds that the mean number of typographical errors per page is nine. Find the probability that (a) exactly five typographical errors are found on a page, (b) at most five typographical errors are found on a page, and (c) more than five typographical errors are found on a page.

(a) $P(\text{exactly five typographical errors are found on a page}) = \square$
(Round to four decimal places as needed.)

(b) $P(\text{at most five typographical errors are found on a page}) = \square$
(Round to four decimal places as needed.)

(c) $P(\text{more than five typographical errors are found on a page}) = \square$
(Round to four decimal places as needed.)

Which of the events are unusual? Select all that apply.

- ☐ A. The event in part (a) is unusual.
☐ B. The event in part (b) is unusual.
☐ C. The event in part (c) is unusual.
☐ D. None of the events are unusual.
-

15. Find the indicated probabilities using the geometric distribution or Poisson distribution. Then determine if the events are unusual. If convenient, use a Poisson probability table or technology to find the probabilities.

A major hurricane is a hurricane with wind speeds of 111 miles per hour or greater. During the last century, the mean number of major hurricanes to strike a certain country's mainland per year was about 0.67. Find the probability that in a given year (a) exactly one major hurricane will strike the mainland, (b) at most one major hurricane will strike the mainland, and (c) more than one major hurricane will strike the mainland.

(a) $P(\text{exactly one major hurricane will strike the mainland}) = \square$
(Round to three decimal places as needed.)

(b) $P(\text{at most one major hurricane will strike the mainland}) = \square$
(Round to three decimal places as needed.)

(c) $P(\text{more than one major hurricane will strike the mainland}) = \square$
(Round to three decimal places as needed.)

Which of the events are unusual? Select all that apply.

- ☐ A. The event in part (a) is unusual.
- ☐ B. The event in part (b) is unusual.
- ☐ C. The event in part (c) is unusual.
- ☐ D. None of the events are unusual.
-