$$p(x) = \frac{(5!)(.65)^x(.35)^{5-x}}{(x!)(5-x)}$$

1. The probability distribution for a random variable, x, is shown. What's the probability that $x = 0$?

- **A.** 0
- **B.** .1160
- **C.** .1811
- **D.** .0053

Chocolate: 13%; Lemon: 14%; Cherry: 13%; Raspberry: 24%; Orange: 20%; Grape: 16%

2. A candy company makes sweets in six different flavors. According to the company, each flavor is manufactured at a different rate based on customer preference. The list shows the total percentage of the company's candy production in each flavor. If you choose a candy from the factory's production line at random, what's the probability that it's either cherry, grape, or lemon flavored?

- A. .566
- B. .99
- C. .43
- D. .76

3. The Internal Revenue Service (IRS) audited 1,242,479 individual tax returns in the year 2023. A total of 145,236,429 individuals filed tax returns that year. Also in 2023, the IRS audited 25,905 corporate tax returns out of a total of 1,924,887 filed. What's the probability that your tax return was *not* selected for an audit in 2023? Assume you filed only one individual return that year, and assume that returns are selected for audits at random.

- A. .9865
- B. .0135
- C. .9914
- D. .0086

4. Consider an experiment that results in a positive outcome with probability 0.38 and a negative outcome with probability 0.62. Create a new experiment consisting of repeating the original experiment 3 times. Assume each repetition is independent of the others. What's the probability of three successes?

- A. 0.055
- B. 0.238
- C. 0.762
- D. 1.14

5. A random sample of 10 employees is selected from a large firm. For the 10 employees, the number of days each was absent during the past month was found to be 0, 2, 4, 2, 5, 1, 7, 3, 2, and 4. Of the following values, which would you use as the point estimate for the average number of days absent for all the firm's employees?

- A. 2.5
- B. 3
- C. 4
- D. 30

6. The possible values of x in a certain continuous probability distribution consist of the infinite number of values between 1 and 20. Solve for $P(x = 4)$.

- A. 0.00
- B. 0.05
- C. 0.02
- D. 0.03

7. If x is a binomial random variable, find p(x) when n = <5, x = 1, and p = .2

- A. .4096
- B. .1611
- C. .644
- D. .027

8. A federal auditor for nationally chartered banks, from a random sample of 100 accounts, found that the average demand deposit balance at the First National Bank of Arkansas was $549.82. If the auditor needed a point estimate for the population mean for all accounts at this bank, what should he use?

- A. The auditor should survey the total of all accounts and determine the mean.
- B. There's no acceptable value available.
- C. The average of $549.82 for this sample.
- D. The average of $54.98 for this sample.

9. A new car salesperson knows that she sells a car to one customer out of 20 who enter the showroom. Find the probability that she will sell a car to exactly two of the next three customers.

- A. 0.0071
- B. 0.9939
- C. 0.1354
- D. 0.0075

	Low	Medium	High
On	.5	.1	.05
Off	.25	.07	.03

10. A gadget has three temperature options (Low, Medium, and High) and two power settings (On and Off). You conduct an experiment where you observe the status of the machine throughout its day-to-day use, and the probabilities associated with each of the possible outcome pairs is shown. Consider the following events:
A: {On}
B: {Medium or On}
C: {Off and Low}
D: {High}
Find *P*(B).

- A. .6
- B. .65
- C. .72
- D. .5

11. If the sampling distribution of a sample statistic has a mean equal to the population parameter the statistic is intended to estimate, the statistic is said to be a/an _____ estimate of the parameter.

- A. independent
- B. unbiased
- C. point
- D. biased

12. **In the binomial probability distribution, *p* stands for the**

- **A.** probability of success in any given trial.
- **B.** number of trials.
- **C.** probability of failure in any given trial.
- **D.** number of successes.

13. The probability of an offender having a speeding ticket is 35%, having a parking ticket is 44%, and having both is 12%. What's the probability of an offender having either a speeding ticket or a parking ticket or both?

- A. 67%
- B. 91%
- C. 55%
- D. 79%

14. A pair of dice is tossed and the face number of each die is recorded. Assuming the dice are fair, what's the probability of the sum of the die faces showing is even?

- **A.** $^1/_{12}$
- **B.** $^1/_6$
- **C.** $^1/_{36}$
- **D.** $^1/_2$

15. An apartment complex has two activating devices in each fire detector. One is smoke-activated and has a probability of .98 of sounding an alarm when it should. The second is a heat-sensitive activator and has a probability of .95 of operating when it should. Each activator operates independently of the other. Presume a fire starts near a detector. What's the probability that both activating devices will work properly?

- A. 0.931
- B. 0.966
- C. 0.049
- D. 0.9896

16. Let event *A* = rolling a one on a die, and let event *B* = rolling an even number on a die. Which of the following is *correct* concerning these two events?

- **A.** On a Venn diagram, event *B* would contain event *A*.
- **B.** On a Venn diagram, event *A* would overlap event *B*.
- **C.** Events *A* and *B* are exhaustive.
- **D.** Events *A* and *B* are mutually exclusive.

17. Robotics manufacturers can design mobility features in one of several ways. Robots can have legs, wheels, both legs and wheels, or no legs or wheels. Using a random sample of 106 robots, researchers found that 63 had legs only, 20 had wheels only, 8 had both legs and wheels, and 15 had no legs or wheels. Use the rule of complements to find the probability that a randomly selected robot will have either legs or wheels.

- A. .699
- B. .858
- C. .849
- D. .075

18. If *x* is a binomial random variable, find p(*x*) when $n = 4$, $x = 2$, and $q = .4$

- **A.** .027
- **B.** .3456
- **C.** .1611
- **D.** .644

19. **Assume x is a normally distributed random variable with mean = 11 and variance = 2. Find $P(10 \leq x \leq 12)$.**

- **A.** .1525
- **B.** .3023
- **C.** 0
- **D.** .3830

20. To determine whether a piece of factory equipment is working properly, the floor manager performs a test run of 25 units. Each unit is measured, and the factory worker finds that the standard deviation in the measurements over a long period of time is .001. What's the approximate probability that the mean measurement of the units from the test run will lie within .0001 of the mean unit measurement?

A. .2760
B. .3953
C. .3542
D. .3830