

1. Suppose you are told that the average return on investment for a particular class of investments was 7.8% with a standard deviation of 2.3. Furthermore, the histogram of the distribution of returns is approximately bell-shaped. We would expect that 95 percent of all of these investments had a return between what two values?
 - a. 5.5% and 10.1%
 - b. 0% and 15%
 - c. 3.2% and 12.4%
 - d. 0.9% and 14.7%
 - e. 3.2% and 14.7%

2. A bored carpenter counts the actual number of nails in 10 boxes of nails and records his findings as: 230, 235, 302, 287, 312, 323, 265, 319, 342, and 298. What can we say about the shape of the distribution of the number of nails?
 - a. Symmetric
 - b. Skewed to the right.
 - c. Approximately bell-shaped.
 - d. Skewed to the left.
 - e. None of the above

3. For a sample of size 5, if $x_1 - \bar{x} = -5$, $x_2 - \bar{x} = 9$, $x_3 - \bar{x} = -7$, and $x_4 - \bar{x} = -2$, then the sample standard deviation is
 - a. 5.639
 - b. 6.305
 - c. 6.066
 - d. 6.782
 - e. 5.936

4. The following data represent a sample of 10 scores on a statistics quiz: 16, 16, 16, 16, 16, 18, 18, 20, 20, and 20.
- Mean = 17.6, Median = 17, Mode = 16
 - Mean = 17, Median = 16, Mode = 17
 - Mean = 18, Median = 18.5, Mode = 18
 - Mean = 10, Median = 19, Mode = 20
 - Mean = 15.5, Median = 17, Mode = 16

5. Consider the following frequency distribution. What is the missing frequency value identified by the asterisk?

<i>Bin</i>	<i>Frequency</i>	<i>Cumulative %</i>
584	1	4.00%
1774.4	*	64.00%
2964.8	4	80.00%
4155.2	3	92.00%
5345.6	1	96.00%
More	1	100.00%

- 3
 - 15
 - 16
 - 25
 - 20
6. Let the random variable Z follow a standard normal distribution. Find the value k , such that $P(Z > k) = 0.39$.
- 1.23
 - 1.23
 - 0.28
 - 0.65
 - 0.28

7. Let the random variable Z follow a standard normal distribution. Find $P(-2.21 < Z < 0)$.
- a. 0.9864
 - b. 0.4864
 - c. 0.0136
 - d. 0.5136
 - e. 0.2432
8. Let the random variable X follow a normal distribution with a mean of 17.1 and a standard deviation of 3.2.
What is $P(X > 16)$?
- a. 0.6331
 - b. 0.3401
 - c. 0.3669
 - d. 0.8326
 - e. 0.1674
9. The number of orders that come into a mail-order sales office each month is normally distributed with a mean of 298 and a standard deviation of 15.4. What is the probability that in a particular month the office receives more than 310 orders?
- a. 0.7823
 - b. 0.2826
 - c. 0.2177
 - d. 0.7174
 - e. 0.1774

10. If two students are selected at random from a class of eight boys and nine girls. Then the probability that both students selected are girls is:

a. $\frac{1}{36}$

b. $\frac{2}{9}$

c. $\frac{2}{17}$

d. $\frac{1}{68}$

e. $\frac{9}{34}$

11. Let A and B be two events such that $P(A) = \frac{1}{5}$, While $P(A \text{ or } B) = \frac{1}{2}$. Let $P(B) = p$. For what values of p are A and B independent?

a. $\frac{3}{8}$

b. $\frac{3}{10}$

c. $\frac{1}{10}$ and $\frac{3}{10}$

d. $\frac{4}{5}$ and $\frac{3}{10}$

e. $\frac{4}{5}$

12. A survey of executives revealed that 35% of them regularly read The Wall Street Journal, 20% read Forbes, and 10% read both The Wall Street Journal and Forbes. What is the probability that a particular executive reads either The Wall Street Journal or Forbes?

a. 0.35

b. 0.25

c. 0.55

d. 0.45

e. 0.65

13. A manufacturer of automobiles conducted a market survey. Eighty percent of the customers want better fuel efficiency, while 55% want a vehicle navigation system and 45% percent want both features. The probability that a person wants a better fuel efficiency given that he wants a vehicle navigation system is approximately:

- a. 0.90.
- b. 0.45.
- c. 0.82.
- d. 0.56.
- e. 0.41.

14. In a furniture manufacturing plant, a customer survey indicates that blemishes in the finish are a major concern. The table shown below displays the probability distribution of the number of defects in the finish of new furniture.

Number of Defects	0	1	2	3	4	5
Probability	0.34	0.25	0.19	0.11	0.07	0.04

The mean and the standard deviation for the number of defects are:

- a. Mean = 1.78, Standard deviation = 1.92
 - b. Mean = 1.44, Standard deviation = 1.43
 - c. Mean = 1.44, Standard deviation = 1.92
 - d. Mean = 1.78, Standard deviation = 1.38
 - e. Mean = 4.46, Standard deviation = 1.78
15. Suppose that a large lot of fuses contains 10% defectives. If ten fuses are randomly sampled from the lot, then the probability that at least two of them are defective equals:
- a. 0.2639
 - b. 0.3487
 - c. 0.6513
 - d. 0.6126
 - e. 0.7361

16. A particular telephone number is used to receive both voice calls and fax messages. Suppose that 25% of the incoming calls involve fax messages, and consider a sample of 25 incoming calls. What is the expected number of calls among the 25 that involve a fax message?
- 18.75
 - 4.6875
 - 25
 - 20
 - 6.25
17. An investment firm offers three stock of portfolios: A, B, and C. Then number of blocks of each type of stock in each of these portfolios is summarized in the following table:

Risk	Portfolio		
	A	B	C
High	1	1	1
Moderate	4	5	7
Low	1	2	3

A client wants 11 blocks of high-risk stock, 63 blocks of moderate-risk stock, and 25 blocks of low-risk stock. How many of each portfolio should be suggested?

- 2 blocks from A, 3 blocks from B, and 3 blocks from C
 - 1 block from A, 5 blocks from B, and 5 blocks from C
 - 2 blocks from A, 2 blocks from B, and 7 blocks from C
 - 2 blocks from A, 4 blocks from B, and 5 blocks from C
 - 4 blocks from A, 2 blocks from B, and 5 blocks from C
18. The amount of money that should be invested now at 6% interest rate so that after 2 years the amount will be \$10,000 when the interest is compounded Monthly equals to:
- \$ 2,469.79
 - \$ 8,871.86
 - \$ 9,900.75
 - \$8,899.96
 - \$ 11,271.98

19. A person has debts of \$500 due in three years with interest at 5% compounded annually and \$ 500 due in four years with interest at 6% compounded semiannually. The debtor wants to pay off these debts by making two payments: the first payment now, and the second, which is double the first payment, at the end of the third year. If the money is worth 7% compounded annually, then the first payment equals:
- a. \$286.40
 - b. \$437.56
 - c. \$313.99
 - d. \$275.54
 - e. \$309.95
20. How long will it take an investment to double in value if it earns 5% compounded continuously?
- a. 14.21 years
 - b. 16.67 years
 - c. 6.93 years
 - d. 10.45 years
 - e. 13.86 years
21. Suppose a man purchases a house with an initial down payment of \$20,000 and then makes quarterly payments as follows: \$2,000 at the end of each quarter for six years and \$3,500 due thereafter at the end of each quarter for eight years. Given an interest rate of 6% compounded quarterly, then the present value of the house to the nearest integer value, equals:
- a. \$121,923
 - b. \$160,000
 - c. \$230,134
 - d. \$248,972
 - e. \$167,325

22. The "current ratio" of a company is the ratio of its current assets to its current liabilities. Suppose a company has current assets of \$250,000 and current liabilities of \$100,000. If the company wants to make a short-term loan and have their current ratio no less than 2.2, what is the maximum amount it can borrow? (Note: The funds they receive are considered as current assets and the loan as a current liability.)

- a. \$15,000
- b. \$20,000
- c. \$25,000
- d. \$30,000
- e. \$33,000

23. Suppose $f(1) = -5$ and $f(-2) = 4$. Find $f(x)$ if f is a linear function.

- a. $f(x) = -3x + 5$
- b. $f(x) = -\frac{x}{3} + \frac{14}{3}$
- c. $f(x) = -3x - 2$
- d. $f(x) = \frac{x}{3} - \frac{16}{3}$
- e. $f(x) = \frac{x}{3} + \frac{2}{3}$

24. Find the minimum value of $g(x) = 3x^2 - 3x + 4$.

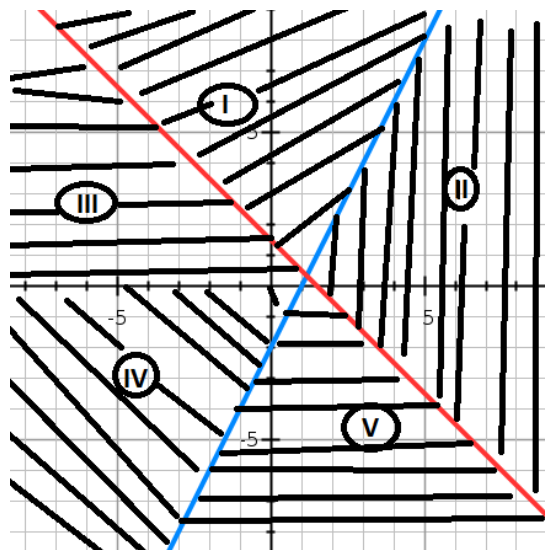
- a. 4
- b. $1/2$
- c. $-5/2$
- d. $13/4$
- e. 0

25. The supply and demand equations for a product are $p = \frac{1}{10}q + 20$ and $p = 200 - \frac{1}{2}q$, respectively, where q represents the number of units and p represents the price per unit in dollars. The equilibrium price is

- a. \$10
- b. \$20
- c. \$30
- d. \$40
- e. \$50

26. Which of the shaded regions is the solution for the following system? $\begin{cases} 2x - 2 \geq y \\ 2x \leq 3 - 2y \end{cases}$

- a. Region II
- b. Region V
- c. Region III
- d. Region I
- e. Region VI



27. For the following linear programming problem

$$\text{Maximize } Z = 10x + 15y$$

$$\text{subject to } x + 4y \leq 360$$

$$2x + y \leq 300$$

$$x \geq 0, y \geq 0$$

The corner points of the feasible region are $(0,0)$, $(0,90)$, $(150,0)$, and (a,b) .

Then the point (a,b) and the maximum value of Z are:

- $(90,0)$ and the maximum value of Z is 900
- $(0,300)$ and the maximum value of Z is 4,500
- $(120,0)$ and the maximum value of Z is 1,200
- $(120,60)$ and the maximum value of Z is 2,100
- $(0,60)$ and the maximum value of Z is 900

28. The solution for the following linear programming problem using the dual and simplex method is:

$$\text{Minimize } Z = 6x_1 + 4x_2$$

$$\text{subject to } -x_1 + x_2 \leq 1$$

$$x_1 + x_2 \geq 3$$

$$x_1, x_2 \geq 0,$$

- $x_1 = 1, x_2 = 2, Z = 14$
- $x_1 = 2, x_2 = 1, Z = 22$
- $x_1 = 1, x_2 = 5, Z = 26$
- $x_1 = 0, x_2 = 4, Z = 16$
- $x_1 = 2, x_2 = 0, Z = 12$