

Name ____ (Read Only Copy) _____

Use the Word document Template provided for this test. Place the letter in the right hand column.

Be sure to show ALL work that leads to your letter choice, on the Test Template.

If the required work is missing, there will be NO credit given for that problem

Return your complete Test Template, as an attached Word document.

31 Problems: 8 Points each

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**Compute r , the coefficient of correlation.**

- 1) The test scores of 6 randomly picked students and the number of hours they prepared are as follows: 1) _____

Hours	4	10	5	5	3	3
Score	54	99	56	99	70	72

- A) $-.6781$ B) $-.2241$ C) $.2015$ D) $.6039$

Determine the equation of the line described. Put answer in the slope-intercept form, if possible.

- 2) Through $(2, -8)$, parallel to $-7x - 5y = 6$ 2) _____
- A) $y = -\frac{7}{5}x - \frac{26}{5}$ B) $y = \frac{7}{5}x + \frac{26}{5}$ C) $y = \frac{2}{5}x - \frac{6}{5}$ D) $y = -\frac{5}{7}x + \frac{8}{7}$

Solve the problem.

- 3) Northwest Molded molds plastic handles which cost \$1.00 per handle to mold. The fixed cost to run the molding machine is \$4461 per week. If the company sells the handles for \$4.00 each, how many handles must be molded weekly to break even? 3) _____
- A) 892 handles B) 991 handles C) 4461 handles D) 1487 handles
- 4) Find an equation for the least squares line representing weight, in pounds, as a function of height, in inches, of men. Then, predict the height of a man who is 145 pounds to the nearest tenth of an inch. The following data are the (height, weight) pairs for 8 men: $(66, 150)$, $(68, 160)$, $(69, 166)$, $(70, 175)$, $(71, 181)$, $(72, 191)$, $(73, 198)$, $(74, 206)$. 4) _____
- A) 63.2 inches B) 68.2 inches C) 64.6 inches D) 65.7 inches

Write a cost function for the problem. Assume that the relationship is linear.

- 5) An electrician charges a fee of \$50 plus \$35 per hour. Let $C(x)$ be the cost in dollars of using the electrician for x hours. 5) _____
- A) $C(x) = 35x - 50$ B) $C(x) = 50x + 35$ C) $C(x) = 50x - 35$ D) $C(x) = 35x + 50$

Write an equation for the line. Use slope-intercept form, if possible.

- 6) Through $(-6, 5)$ and $(-2, 8)$ 6) _____
- A) $y = -\frac{11}{10}x + \frac{51}{5}$ B) $y = -\frac{3}{4}x + \frac{19}{2}$ C) $y = \frac{11}{10}x + \frac{51}{5}$ D) $y = \frac{3}{4}x + \frac{19}{2}$

Find the inverse, if it exists, for the matrix.

7) $\begin{bmatrix} 1 & 6 \\ 3 & 6 \end{bmatrix}$

7) _____

A)

$$\begin{bmatrix} -\frac{1}{2} & \frac{1}{2} \\ \frac{1}{4} & -\frac{1}{12} \end{bmatrix}$$

B)

$$\begin{bmatrix} -\frac{1}{12} & \frac{1}{2} \\ \frac{1}{4} & -\frac{1}{2} \end{bmatrix}$$

C)

$$\begin{bmatrix} -\frac{1}{2} & -\frac{1}{2} \\ -\frac{1}{4} & -\frac{1}{12} \end{bmatrix}$$

D)

$$\begin{bmatrix} \frac{1}{4} & -\frac{1}{12} \\ -\frac{1}{2} & \frac{1}{2} \end{bmatrix}$$

Perform the indicated operation where possible.

8) $\begin{bmatrix} -3x - 10y & 6x + 9y \\ -6x - 3y & -9x - 7y \end{bmatrix} + \begin{bmatrix} -9x + 3y & -3x \\ 3y - 9x & 2x + 2y \end{bmatrix}$

8) _____

A)

$$\begin{bmatrix} 6x - 13y & 9 + 9y \\ 9x & 2x + 2y \end{bmatrix}$$

B)

$$\begin{bmatrix} -12x - 7y & 3x + 9y \\ -3x - 12y & -7x - 5y \end{bmatrix}$$

C)

$$\begin{bmatrix} -12x - 7y & 3x + 9y \\ -15x & -7x - 5y \end{bmatrix}$$

D)

$$\begin{bmatrix} -12x - 7y & 3x + 9y \\ 9x & -7x + 9y \end{bmatrix}$$

E) Not possible

Solve the problem.

- 9) Suppose the following matrix represents the input-output matrix of a simplified economy with just three sectors: manufacturing, agriculture, and transportation. 9) _____

$$\begin{array}{c} \text{Mfg Agri Trans} \\ \text{Mfg} \begin{bmatrix} 0 & .25 & .33 \end{bmatrix} \\ \text{Agri} \begin{bmatrix} .50 & 0 & .25 \end{bmatrix} \\ \text{Trans} \begin{bmatrix} .25 & .25 & 0 \end{bmatrix} \end{array}$$

Suppose also that the demand matrix is as follows:

$$D = \begin{bmatrix} 531 \\ 274 \\ 149 \end{bmatrix}$$

Find the amount of each commodity that should be produced.

- A) 1158 units of manufacturing, 1093 units of agriculture, and 742 units of transportation.
 B) 707 units of manufacturing, 654 units of agriculture, and 85 units of transportation.
 C) 965 units of manufacturing, 911 units of agriculture, and 618 units of transportation.
 D) 965 units of manufacturing, 1093 units of agriculture, and 618 units of transportation.

Solve the system of equations by using the inverse of the coefficient matrix.

10) $x - y + z = -6$
 $x + y + z = -10$
 $x + y - z = 0$

10) _____

A) (-3, -2, -5)

B) (-3, -5, -2)

C) (-5, -3, -2)

D) No inverse, no solution for system

Use the echelon method to solve the system of three equations in three unknowns.

11) $x - y + 4z = 19$

$2x + z = 4$

$x + 3y + z = -5$

A) $(4, 0, -3)$

B) $(4, -3, 0)$

C) $(0, -3, 4)$

D) No solution

11) _____

Solve the problem.

- 12) An appliance store sells two types of refrigerators. Each Cool-It refrigerator sells for \$640 and each Polar sells for \$740. Up to 330 refrigerators can be stored in the warehouse and new refrigerators are delivered only once a month. It is known that customers will buy at least 80 Cool-Its and at least 100 Polars each month. How many of each brand should the store stock and sell each month to maximize revenues?

A) 95 Cool-Its and 235 Polars

B) 80 Cool-Its and 250 Polars

C) 230 Cool-Its and 100 Polars

D) 310 Cool-Its and 175 Polars

12) _____

Solve using artificial variables.

13) Maximize $z = 5x_1 + 4x_2$

subject to: $x_1 + 2x_2 = 15$

$x_1 + x_2 \geq 12$

$2x_1 + x_2 \leq 30$

$x_1 \geq 0, x_2 \geq 0$

A) Maximum is 75 for $x_1 = 15, x_2 = 0$

B) Maximum is 63 for $x_1 = 11, x_2 = 2$

C) Maximum is 60 for $x_1 = 0, x_2 = 15$

D) Maximum is 57 for $x_1 = 9, x_2 = 3$

13) _____

Solve using the simplex method.

- 14) Find $x_1 \geq 0$ and $x_2 \geq 0$ such that

$3x_1 + 3x_2 \geq 60$

$2x_1 + 5x_2 \leq 120$

and $z = 5x_1 + 4x_2$ is maximized.

A) $x_1 = 40, x_2 = 8, z = 232$

B) $x_1 = 60, x_2 = 0, z = 300$

C) $x_1 = 30, x_2 = 20, z = 230$

D) $x_1 = 0, x_2 = 24, z = 96$

14) _____

State the dual problem. Use y_1, y_2, y_3 and y_4 as the variables. Given: $y_1 \geq 0, y_2 \geq 0, y_3 \geq 0$, and $y_4 \geq 0$.

15) Minimize $w = 6x_1 + 3x_2$

subject to: $3x_1 + 2x_2 \geq 34$

$2x_1 + 5x_2 \geq 43$

$x_1 \geq 0, x_2 \geq 0$

A) Maximize $z = 34y_1 + 43y_2$

B) Maximize $z = 43y_1 + 34y_2$

subject to: $3y_1 + 2y_2 \geq 6$

subject to: $2y_1 + 3y_2 \geq 6$

$2y_1 + 5y_2 \geq 3$

$5y_1 + 2y_2 \geq 3$

C) Maximize $z = 43y_1 + 34y_2$

D) Maximize $z = 34y_1 + 43y_2$

subject to: $2y_1 + 3y_2 \leq 6$

subject to: $3y_1 + 2y_2 \leq 6$

$5y_1 + 2y_2 \leq 3$

$2y_1 + 5y_2 \leq 3$

15) _____

The initial tableau of a linear programming problem is given. Use the simplex method to solve the problem.

- 16)
$$\begin{array}{cccccc|c} x_1 & x_2 & x_3 & s_1 & s_2 & z & \\ \hline 4 & 2 & 1 & 1 & 0 & 0 & 4 \\ 3 & 1 & 4 & 0 & 1 & 0 & 8 \\ \hline -2 & 1 & -3 & 0 & 0 & 1 & 0 \end{array}$$
- 16) _____
- A) Maximum at 4 for $x_2 = 2$, $s_1 = 2$ B) Maximum at 12 for $x_1 = 2$, $x_3 = 2$
 C) Maximum at 6 for $x_3 = 2$, $s_1 = 2$ D) Maximum at 8 for $x_3 = 2$, $s_1 = 2$

Use the simplex method to solve the linear programming problem.

- 17) Minimize $w = 4y_1 + 4y_2$ 17) _____
 subject to: $5y_1 + 10y_2 \geq 100$
 $10y_1 + 20y_2 \geq 150$
 $y_1 \geq 0$, $y_2 \geq 0$
- A) 60 when $y_1 = 0$ and $y_2 = 20$ B) 10 when $y_1 = 0$ and $y_2 = 50$
 C) 40 when $y_1 = 0$ and $y_2 = 10$ D) 20 when $y_1 = 4$ and $y_2 = 4$

Find the indicated probability.

- 18) The age distribution of students at a community college is given below. 18) _____

Age (years)	Number of students (f)
Under 21	414
21-25	404
26-30	200
31-35	53
Over 35	23
	1094

A student from the community college is selected at random. Find the probability that the student is at least 31. Round your answer to three decimal places.

- A) 76 B) 0.048 C) 0.931 D) 0.069

Find the probability.

- 19) A basketball player hits her shot 42% of the time. If she takes four shots during a game, what is the probability that she misses the first shot and hits the last three? Express the answer as a percentage, and round to the nearest tenth (if necessary). Assume independence of shots. 19) _____
- A) 3.1% B) 4.3% C) 43% D) 31.1%

Use the union rule to answer the question.

- 20) If $n(B) = 36$, $n(A \cap B) = 7$, and $n(A \cup B) = 63$; what is $n(A)$? 20) _____
- A) 27 B) 34 C) 36 D) 32

Find the probability of the following card hands from a 52-card deck. In poker, aces are either high or low. A bridge hand is made up of 13 cards.

- 21) In poker, a flush (5 in same suit) in any suit 21) _____
- A) .00198 B) .00122 C) .000495 D) .000347

Give the probability distribution and sketch the histogram.

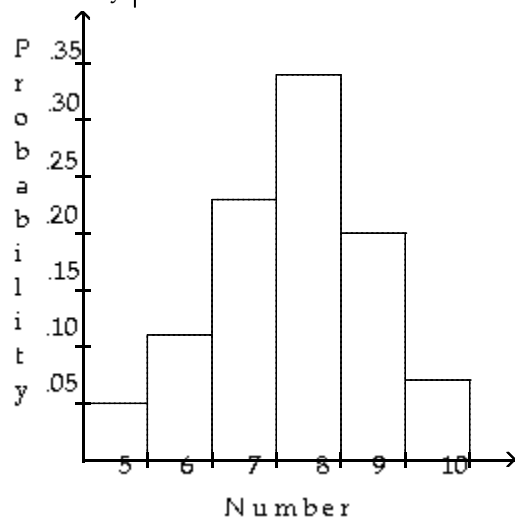
22) A class of 44 students took a 10-point quiz. The frequency of scores is given in the table.

22) _____

Number of Points	Frequency
5	2
6	5
7	10
8	15
9	9
10	3
Total: 44	

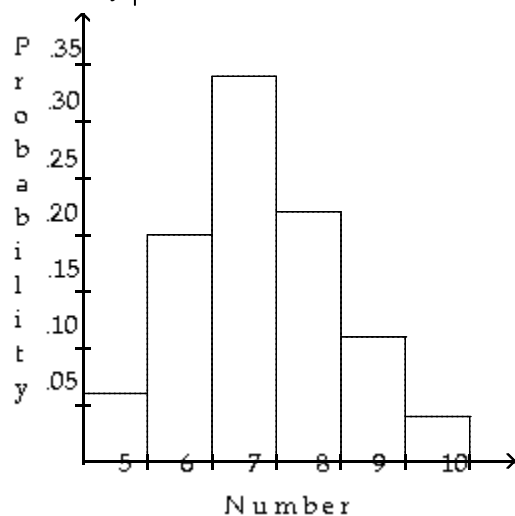
A)

Number	5	6	7	8	9	10
Probability	.05	.11	.23	.34	.20	.07



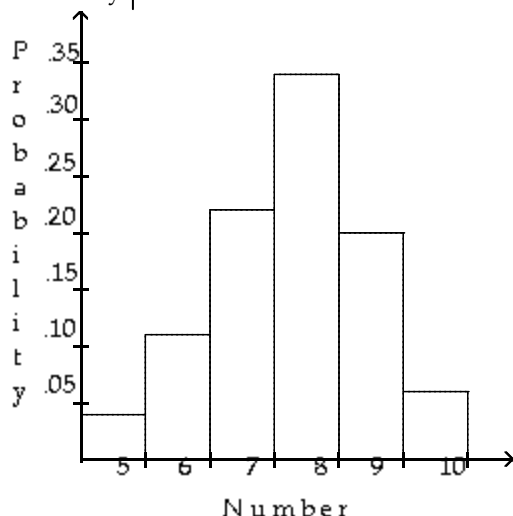
B)

Number	5	6	7	8	9	10
Probability	.06	.20	.34	.22	.11	.04



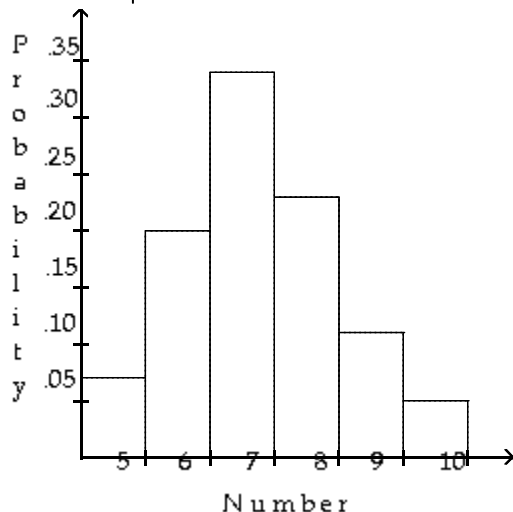
C)

Number	5	6	7	8	9	10
Probability	.04	.11	.22	.34	.20	.06



D)

Number	5	6	7	8	9	10
Probability	.07	.20	.34	.23	.11	.05



Solve the problem.

- 23) In how many ways can 7 people be chosen and arranged in a straight line, if there are 9 people from whom to choose? 23) _____
- A) 144 ways B) 181,440 ways C) 72 ways D) 63 ways

To win the World Series, a baseball team must win 4 games out of a maximum of 7 games. To solve the problem, list the possible arrangements of losses and wins.

- 24) How many ways are there of winning the World Series in exactly 6 games if the winning team wins the last two games? 24) _____
- A) 3 ways B) 2 ways C) 6 ways D) 4 ways

Four accounting majors, two economics majors, and three marketing majors have interviewed for five different positions with a large company. Find the number of different ways that five of these could be hired.

- 25) There is no restriction on the college majors hired for the five positions. 25) _____
- A) 24 ways B) 120 ways C) 15,120 ways D) 3024 ways

At one high school, students can run the 100-yard dash in an average of 15.2 seconds with a standard deviation of .9 seconds. The times are very closely approximated by a normal curve. Find the percent of times that are:

- 26) Between 16.1 and 17 seconds 26) _____
 A) 12% B) 27% C) 34% D) 13.6%

Find the probability of the result using the normal curve approximation to the binomial distribution.

- 27) On a hospital floor, 60 patients have a disease with a mortality rate of 0.1. Five of them die. 27) _____
 A) .163 B) .155 C) .666 D) .170

Find the standard deviation of the data summarized in the given frequency table.

- 28) The heights of a group of professional basketball players are summarized in the frequency table below. Find the standard deviation. Round your answer to one decimal place. 28) _____

Height (in.)	Frequency
70 - 71	3
72 - 73	7
74 - 75	16
76 - 77	12
78 - 79	10
80 - 81	4
82 - 83	1

- A) 3.3 B) 2.8 C) 2.9 D) 3.2

Solve the problem using the normal curve approximation to the binomial distribution.

- 29) A multiple choice test consists of 60 questions. Each question has 4 possible answers of which one is correct. If all answers are random guesses, estimate the probability of getting at least 20% correct. 29) _____
 A) .8508 B) .0901 C) .3508 D) .1492

Solve the problem. Round to the nearest hundredth, if necessary.

- 30) The following data gives the number of applicants that applied for a job at a given company each month of 1999: 64, 67, 94, 76, 78, 82, 87, 88, 90, 94, 73, 64. What is the mean of the data? 30) _____
 A) 74.42 B) 79.75
 C) 95.7 D) There is no mean.

Suppose 500 coins are tossed. Using the normal curve approximation to the binomial distribution, find the probability of the indicated results.

- 31) 240 heads or more 31) _____
 A) .829 B) .874 C) .816 D) .826