Name..

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) True or False: If p remains constant in a binomial distribution, an increase in n will increase the variance.   1) _____

TABLE - 1 : The following table contains the probability distribution for X = the number of retransmissions necessary to successfully transmit a 1024K data package through a double satellite media.

X	0	1	2	3
$P(X)$	0.35	0.35	0.25	0.05

2) Referring to Table -1, the probability of no retransmissions is _____.   2) _____

3) Referring to Table -1, the probability of at least one retransmission is _____.   3) _____

4) Referring to Table -1, the mean (or expected value) for the number of retransmissions is _____.   4) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

5) Given that X is a normally distributed random variable with a mean of 50 and a standard deviation of 2, find the probability that X is between 47 and 54.

6) Suppose Z has a standard normal distribution with a mean of 0 and standard deviation of 1. The probability that Z values are larger than _____ is 0.3483.   6) _____

7) Suppose Z has a standard normal distribution with a mean of 0 and standard deviation of 1. 85% of the possible Z values are smaller than _____.   7) _____

8) The amount of time necessary for assembly line workers to complete a product is a normal random variable with a mean of 15 minutes and a standard deviation of 2 minutes. The probability is _____ that a product is assembled in less than 20 minutes.   8) _____

Obtain the probability distribution of the random variable.

9) When a coin is tossed four times, sixteen equally likely outcomes are possible as shown below: 9) _____

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HHHH   HHHT   HHTH   HHTT
HTHH   HTHT   HTTH   HTTT
THHH   THHT   THTH   THTT
TTHH   TTHT   TTTH   TTTT
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Let X denote the total number of tails obtained in the four tosses. Find the probability distribution of the random variable X. Leave your probabilities in fraction form.

A)

x	P(X = x)
1	1/4
2	7/16
3	1/4
4	1/16

B)

x	P(X = x)
0	1/16
1	1/8
2	3/8
3	1/8
4	1/16

C)

x	P(X = x)
0	1/16
1	3/16
2	1/2
3	3/16
4	1/16

D)

x	P(X = x)
0	1/16
1	1/4
2	3/8
3	1/4
4	1/16

E)

x	P(X = x)
0	0
1	1/4
2	3/8
3	1/4
4	1/16

10) When two balanced dice are rolled, 36 equally likely outcomes are possible as shown below.   10) _____

(1, 1) (1, 2) (1, 3) (1, 4) (1, 5) (1, 6)
(2, 1) (2, 2) (2, 3) (2, 4) (2, 5) (2, 6)
(3, 1) (3, 2) (3, 3) (3, 4) (3, 5) (3, 6)
(4, 1) (4, 2) (4, 3) (4, 4) (4, 5) (4, 6)
(5, 1) (5, 2) (5, 3) (5, 4) (5, 5) (5, 6)
(6, 1) (6, 2) (6, 3) (6, 4) (6, 5) (6, 6)

Let X denote the smaller of the two numbers or the common value if doubles are thrown. Find the probability distribution of X. Leave your probabilities in fraction form.

A)

x	P(X = x)
1	11/36
2	1/4
3	7/36
4	5/36
5	1/12
6	1/36

B)

x	P(X = x)
1	5/18
2	2/9
3	1/6
4	1/9
5	1/18
6	0

C)

x	P(X = x)
1	1/6
2	1/6
3	1/6
4	1/6
5	1/6
6	1/6

D)

x	P(X = x)
1	11/36
2	1/8
3	7/36
4	5/36
5	1/18
6	1/36

E)

x	P(X = x)
1	5/18
2	1/4
3	7/36
4	5/36
5	1/9
6	1/36

Determine the possible values of the random variable.

11) Suppose that two balanced dice are rolled. Let Y denote the product of the two numbers. What are the   11) _____
possible values of the random variable Y?

A) (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)

B) 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 30, 36

C) 2, 3, 4, 5, 6, 8, 10, 12, 15, 18, 20, 24, 30

D) 0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 30, 36

CHAPTER 6

Determine the possible values of the random variable.

12) The following table displays a frequency distribution for the number of siblings for students at a   12) _____
particular middle school. For a randomly selected student from the school, let X denote the number of
siblings of the student. What are the possible values of the random variable X?

Number of siblings	Frequency
0	189
1	245
2	102
3	42
4	24
5	13
6	5
7	2
Total	622

A) 0.304, 0.394, 0.164, 0.068, 0.039, 0.021, 0.008, 0.003
B) 189, 245, 102, 42, 24, 13, 5, 2
C) 0, 1, 2, 3, 4, 5, 6, 7
D) 7

Find the mean of the given probability distribution.

13) The random variable X is the number of siblings of a student selected at random from a particular secondary school. Its probability distribution is given in the table.

x	0	1	2	3	4	5
P(X = x)	$\frac{7}{24}$	$\frac{13}{48}$	$\frac{3}{16}$	$\frac{7}{48}$	$\frac{1}{16}$	$\frac{1}{24}$

13) _____

A) 1.833   B) 1.542   C) 1.438   D) 2.5

Provide an appropriate response.

14) Computer chips often contain surface imperfections. For a certain type of computer chip, 9% contain no imperfections, 22% contain 1 imperfection, 26% contain 2 imperfections, 20% contain 3 imperfections, 12% contain 4 imperfections, and the remaining 11% contain 5 imperfections. Let X represent the number of imperfections in a randomly chosen chip.

14) _____

    a). Specify the probability distribution for the number of imperfections in a randomly chosen chip.

    b). Find the expected number of imperfections in a randomly chosen chip

Use the empirical rule to solve the problem.

15) The systolic blood pressure of 18-year-old women is normally distributed with a mean of 120 mmHg and a standard deviation of 12 mmHg. What percentage of 18-year-old women have a systolic blood pressure between 96 mmHg and 144 mmHg?

15) _____

A) 99.7%   B) 67%   C) 99.99%   D) 95%   E) 68%

16) The lifetimes of light bulbs of a particular type are normally distributed with a mean of 360 hours and a standard deviation of 5 hours. What percentage of the bulbs have lifetimes that lie within 1 standard deviation of the mean?

16) _____

A) 31.74%   B) 34%   C) 95%   D) 68%   E) 84.13%

Select the most appropriate answer.

17) Which of the following is not true about the standard normal distribution?

17) _____

    A) The area under the standard normal curve to the left of z = 0 is negative.
    B) The total area under the standard normal curve is 1.
    C) About 95% of its observations fall between -2 and 2.
    D) About 68% of its observations fall between -1 and 1.
    E) The standard normal curve is symmetric about 0.

Use a table of areas to find the specified area under the standard normal curve.

18) The area that lies between 0 and 3.01

18) _____

A) 0.9974   B) 0.4987   C) 0.9987   D) 0.1217

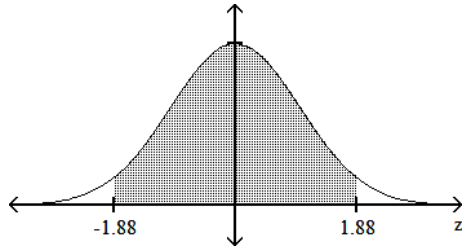19) The area that lies to the left of 1.13

19) _____

A) 0.8907   B) 0.8485   C) 0.8708   D) 0.4354   E) 0.1292

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

20) The area that lies to the right of -1.82 is ....

21) The shaded area shown   21) _____

   A) 0.9699   B) 0.9412   C) 0.9398   D) 0.0602   E) 0.4699

Use a table of areas for the standard normal curve to find the required z-score.
   22) Find the z-score for which the area under the standard normal curve to its left is 0.96   22) _____
      A) 1.03   B) 1.82   C) 1.75   D) -1.75   E) -1.38

   23) Find the z-score having area 0.09 to its left under the standard normal curve.   23) _____
      A) 1.34   B) -1.39   C) -1.45   D) -1.26   E) -1.34

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

   24) Find the z-score having area 0.86 to its right under the standard normal curve. ....

      Provide an appropriate response.

Find the indicated probability for the normally distributed variable.
   25) In 2004, the infant mortality rate (per 1,000 live births) for the 50 states and the District of Columbia had a   25) _____
      mean of 6.98 and a standard deviation of 1.62 (*Statistical Abstract of the United States*). Assuming that the
      distribution is normal, what percentage of states had an infant mortality rate between 5 and 7 percent?
         A) 0.68   B) 0.61   C) 0.39   D) 0.50

   26) Assume that the weights of quarters are normally distributed with a mean of 5.67 g and a standard   26) _____
      deviation 0.070 g. A vending machine will only accept coins weighing between 5.48 g and 5.82 g. What
      percentage of legal quarters will be rejected?
         A) 3.92%   B) 0.0196%   C) 1.96%   D) 2.48%   E) 1.62%

   27) The weekly salaries of elementary school teachers in one state are normally distributed with a mean of   27) _____
      $490 and a standard deviation of $45. What is the probability that a randomly selected elementary school
      teacher earns more than $525 a week?
         A) 0.7823   B) 0.2177   C) 0.4354   D) 0.2823   E) 0.1003

   28) In one region, the September energy consumption levels for single-family homes are normally distributed   28) _____
      with a mean of 1050 kWh and a standard deviation of 218 kWh. For a randomly selected home, find the
      probability that the September energy consumption level is between 1100 kWh and 1225 kWh.
         A) 0.8029   B) 0.0910   C) 0.3791   D) 0.1971   E) 0.2881

Determine whether a probability model based on Bernoulli trials can be used to investigate the situation. If not, explain.
   29) We draw a card from a deck 40 times (replacing the card after each draw). Can the binomial distribution   29) _____
      be used to model the number of cards drawn in each of the four suits?
         A) No. More than two outcomes are possible.
         B) No. The draws are not independent of each other.
         C) Yes.
         D) No. 40 is more than 10% of 52
         E) No. The probability of getting each suit changes from one draw to the next.

Find the mean of the binomial random variable.

30) According to a college survey, 22% of all students work full time. Find the mean for the random variable   30) _____
X, the number of students who work full time in samples of size 16.

    A) 4.00   B) 4.26   C) 0.22   D) 3.52   E) 2.75

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

31) On a 16-question multiple choice test , each question has four possible answers, one of which is correct. For students
who guess at all answers, find the mean and the standard deviation for the random variable X, the number of correct
answers.

Find the standard deviation of the binomial random variable.

32) According to a college survey, 22% of all students work full time. Find the standard deviation for the   32) _____
random variable X, the number of students who work full time in samples of size 16.

    A) 1.66   B) 1.88   C) 2.75   D) 1.98   E) 3.52

Find the indicated probability.

33) A tennis player makes a successful first serve 59% of the time. If she serves 7 times, what is the   33) _____
probability that she gets exactly3 first serves in? Assume that each serve is independent of the others.

    A) 0.4062   B) 0.0058   C) 0.7969   D) 0.2054   E) 0.2031

34) Suppose that11% of people are left handed. If 6 people are selected at random, what is the probability   34) _____
that exactly 2 of them are left handed?

    A) 0.1139   B) 0.0121   C) 0.2278   D) 0.0566   E) 0.0076

35) A basketball player has made 70% of his foul shots during the season. If he shoots 3 foul shots in tonight's   35) _____
game, what is the probability that he makes all of the shots?

    A) 0.21   B) 0.343   C) 0.09   D) 0.686