Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the expected value.

1) In a game, you have a $\frac{1}{45}$ probability of winning $116 and a $\frac{44}{45}$ probability of losing $7. What is   1) _____

your expected value?
   A) –$4.27   B) $2.58   C) –$6.84   D) $9.42

2) A contractor is considering a sale that promises a profit of $38,000 with a probability of 0.7 or a loss   2) _____
   (due to bad weather, strikes, and such) of $18,000 with a probability of 0.3. What is the expected
   profit?
   A) $21,200   B) $20,000   C) $26,600   D) $39,200

3) Suppose you pay $3.00 to roll a fair die with the understanding that you will get back $5.00 for   3) _____
   rolling a 5 or a 4, nothing otherwise. What is your expected value of your gain or loss?
   A) –$3.00   B) $5.00   C) $3.00   D) –$1.33

4) Suppose you buy 1 ticket for $1 out of a lottery of 1000 tickets where the prize for the one winning   4) _____
   ticket is to be $5000. What is your expected value?
   A) $40.00   B) $4.00   C) $0.40   D) –$0.40

5) A 28–year–old man pays $159 for a one–year life insurance policy with coverage of $140,000. If the   5) _____
   probability that he will live through the year is 0.9994, what is the expected value for the insurance
   policy?
   A) –$158.90   B) $139,916.00   C) –$75.00   D) $84.00

6) The prizes that can be won in a sweepstakes are listed below together with the chances of winning   6) _____
   each one:$3500 (1 chance in 8100); $1900 (1 chance in 5400); $700 (1 chance in 3400);
   $400 (1 chance in 2500).
   Find the expected value of the amount won for one entry if the cost of entering is 66 cents.
   A) $0.99   B) $0.49   C) $0.56   D) $400.00

7) Suppose that you arrive at a bus stop randomly, so all arrival times are equally likely. The bus   7) _____
   arrives regularly every 40 minutes without delay. What is the expected value of your waiting time?
   A) 10 min   B) 8 min   C) 20 min   D) 1 min

Decide which of the data sets you would expect to be normally distributed.

8) a.   The number of courses remaining until graduation for the students   8) _____
         in a small liberal arts college
   b.   The heights of male students in an advanced placement mathematics
         class
   c.   The SAT mathematics scores for students in an advanced placement
         mathematics class
   A) b   B) a   C) c   D) none

9) a. The amount of change held by a teacher at the end of each   9) _____
        day for a year
   b. The amount of pocket money held by each student at a
        mid–sized liberal arts college at a given time
   c. The amount of property taxes paid by homeowners in a
        new "affordable housing" subdivision
        A) none   B) a   C) b   D) c

10) a. The heights of the fans at a highly anticipated basketball game   10) _____
    b. The viewership of channels 202 to 550 on Direct TV at 7:00 PM CDT
        on the third Thursday in August 2000
        A) b   B) neither   C) both   D) a

11) a. The amount of income taxes paid by residents of a wealthy neighborhood   11) _____
    b. The results from 1000 spins of a spinner with 4 equally likely outcomes
        A) neither   B) both   C) b   D) a

12) a. The exact weights of a random sample of DVDs from the same manufacturer   12) _____
    b. The body temperatures of the students at the local university
        A) both   B) a   C) b   D) neither

Use the following distribution to answer the question.

Hours of 'life' of light bulbs
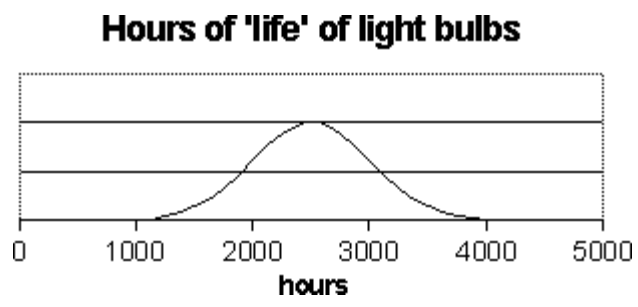
13) What is the total area under the curve?   13) _____
        A) 1   B) 3   C) 2500   D) 3000

14) What is the mean of the distribution?   14) _____
        A) 3000   B) 4000   C) 2500   D) 2000

Apply the 68–95–99.7 rule to answer the question.

15) The lifetimes of light bulbs of a particular type are normally distributed with a mean of 290 hours   15) _____
    and a standard deviation of 5 hours. What percentage of the bulbs have lifetimes that lie within 1
    standard deviation to either side of the mean?
        A) 84%   B) 68%   C) 95%   D) 32%

16) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.5.   16) _____
    What percentage of students at the college have a GPA between 2.4 and 3.4?
        A) 99.7%   B) 84%   C) 68%   D) 95%

17) The annual precipitation for one city is normally distributed with a mean of 382 inches and a standard deviation of 2.5 inches. What percentage of years had precipitation between 377 inches and 387 inches?

17) _____

    A) 68%   B) 99.7%   C) 95%   D) 34%

Find the indicated percentage for the normally distributed variable. Round your answer to two decimal places, if necessary.

18) The volumes of soda in quart soda bottles are normally distributed with a mean of 32 ounces and a standard deviation of 1.2 ounces. What percentage of soda bottles will have a volume less than 31.58 ounces?

18) _____

    A) 32.63%   B) 36.32%   C) 63.68%   D) 95%

19) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. What percentage of the ratings will be between 200 and 250?

19) _____

    A) 95%   B) 33.14%   C) 84.13%   D) 34.13%

20) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. What percentage of the ratings will be between 180 and 210?

20) _____

    A) 95%   B) 57.93%   C) 34.46%   D) 23.47%

21) The lengths of human pregnancies are normally distributed with a mean of 268 days and a standard deviation of 15 days. What is the probability that a human pregnancy lasts at least 289 days?

21) _____

    A) 8.08%   B) 91.92%   C) 99.7%   D) 8.80%

Find the requested percentile.

22) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.6. Find the 75th percentile. Round your answer to one decimal place.

22) _____

    A) 2.5   B) 3.3   C) 3.4   D) 3.2

23) Scores on an English test are normally distributed with a mean of 32.3 and a standard deviation of 7.3. Find the 41st percentile. Round your answer to one decimal place.

23) _____

    A) 30.6   B) 28.0   C) 36.6   D) 34.0

24) The weights of certain machine components are normally distributed with a mean of 8.01 grams and a standard deviation of 0.1 grams. Find the 97th percentile. Round your answer to one decimal place.

24) _____

    A) 8.1 grams   B) 8.0 grams   C) 8.3 grams   D) 8.2 grams

Solve the problem.

25) Which of the following statements concerning areas under the standard normal distribution curve is/are true (if any)?

a. The area to the left of –3 in a standard normal distribution curve is zero.

b. The area under a standard normal distribution curve between any two z–scores is greater than zero.

c. The area under the standard normal normal distribution curve between two z–scores will be negative if both z–scores are negative.

d. The area under the standard normal distribution curve to the left of any z –score is less than 1.

    A) a, b   B) a, c   C) a   D) b, d

25) _____

26) Which of the following statements concerning areas under the standard normal distribution curve is/are true?

a. If a z–score is negative, the area to its right is greater than 0.5

b. If the area to the right of a z–score is less than 0.5, the z–score is negative.

c. If a z–score is positive, the area to its left is less than 0.5

    A) a   B) a, b   C) b, c   D) a, c

26) _____

27) The area under the standard normal distribution curve between 1 and 2 is equal to 0.1359. Scores on a particular aptitude test are normally distributed with a mean of 100 and a standard deviation of 10. Which of the following are equal to 13.59%?

a. The percentage of scores between 120 and 130

b. The percentage of scores between 110 and 120

c. The percentage of scores between 80 and 90

d. The percentage of scores between 90 and 120

e. The percentage of scores between 90 and 110

    A) b   B) b, c   C) e   D) a, b

27) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

28) Decide whether the experiment is a binomial experiment. If it is not, explain why. You observe the gender of the next 150 babies born at a local hospital. The random variable represents the number of girls.

28) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

29) Assume that male and female births are equally likely and that the birth of any child does not affect the probability of the gender of any other children. Find the probability of exactly eight boys in ten births.

    A) 0.08   B) 0.8   C) 0.044   D) 0.176

29) _____

30) Fifty percent of the people that get mail–order catalogs order something. Find the probability that exactly six of 10 people getting these catalogs will order something.

    A) 0.001   B) 0.205   C) 0.600   D) 3.281

30) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

31) You observe the gender of the next 100 babies born at a local hospital. You count the number of girls born. Identify the values of n, p, and q, and list the possible values of the random variable x.

31) _____

32) Twenty-six percent of people in the United States with Internet access go online to get news. A random sample of five Americans with Internet access is selected and asked if they get the news online. Identify the values of n, p, and q, and list the possible values of the random variable x.

32) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

33) The probability that a house in an urban area will be burglarized is 5%. If 50 houses are randomly selected, what is the probability that none of the houses will be burglarized?

33) _____

    A) 0.000   B) 0.001   C) 0.077   D) 0.050

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

34) An airline has a policy of booking as many as 150 persons on a plane that seats 140. Past studies indicate that only 85% of booked passengers show up for their flight. Find the probability that if the airline books 150 persons for a 140-seat plane, not enough seats will be available.

34) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

35) Sixty-five percent of men consider themselves knowledgeable football fans. If 12 men are randomly selected, find the probability that exactly two of them will consider themselves knowledgeable fans.

35) _____

    A) 0.109   B) 0.65   C) 0.001   D) 0.167

36) Assume that male and female births are equally likely and that the birth of any child does not affect the probability of the gender of any other children. Find the probability of at most three boys in ten births.

36) _____

    A) 0.003   B) 0.300   C) 0.172   D) 0.333

37) A test consists of 10 true or false questions. To pass the test a student must answer at least eight questions correctly. If the student guesses on each question, what is the probability that the student will pass the test?

37) _____

    A) 0.8   B) 0.08   C) 0.20   D) 0.055

38) A test consists of 10 multiple choice questions, each with five possible answers, one of which is correct. To pass the test a student must get 60% or better on the test. If a student randomly guesses, what is the probability that the student will pass the test?

38) _____

    A) 0.006   B) 0.060   C) 0.205   D) 0.377

39) In a recent survey, 66% of the community favored building a police substation in their neighborhood. If 14 citizens are chosen, find the probability that exactly 11 of them favor the building of the police substation.

39) _____

    A) 0.148   B) 0.660   C) 0.001   D) 0.786

40) The probability that an individual is left-handed is 0.11. In a class of 40 students, what is the probability of finding five left-handers?

40) _____

    A) 0.179   B) 0.11   C) 0.125   D) 0.000

41) A recent survey found that 70% of all adults over 50 wear glasses for driving. In a random sample   41) _____
of 10 adults over 50, what is the probability that at least six wear glasses?
    A) 0.850   B) 0.006   C) 0.200   D) 0.700

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

42) Decide whether the experiment is a binomial experiment. If it is not, explain why. You roll   42) _____
a die 750 times. The random variable represents the number that appears on each roll of
the die.

43) Decide whether the experiment is a binomial experiment. If it is not, explain why. You   43) _____
spin a number wheel that has 19 numbers 950 times. The random variable represents the
winning numbers on each spin of the wheel.

44) Decide whether the experiment is a binomial experiment. If it is not, explain why. You test   44) _____
four pain relievers. The random variable represents the pain reliever that is most effective.

45) Decide whether the experiment is a binomial experiment. If it is not, explain why. Testing   45) _____
a pain reliever using 40 people to determine if it is effective. The random variable
represents the number of people who find the pain reliever to be effective.

46) Decide whether the experiment is a binomial experiment. If it is not, explain why.   46) _____
Surveying 100 prisoners to see how many crimes in which they were convicted. The
random variable represents the number of crimes in which each prisoner was convicted.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the indicated percentage for the normally distributed variable. Round your answer to two decimal places, if necessary.

47) The monthly incomes of trainees at a local mill are normally distributed, with a mean of $1,100 and   47) _____
a standard deviation $150. What percentage of trainees earn less than $875 a month?
    A) 99.7%   B) 93.32%   C) 6.68%   D) 6.86%

48) Assume that the weights of cents are normally distributed with a mean of 2.500 grams and a   48) _____
standard deviation of 0.03 grams. A vending machine will reject all coins with weights more than 1
standard deviation above or below the mean. What percentage of legal cents will be rejected by the
machine?
   A) 0.3%   B) 32%   C) 5%   D) 68%

Apply the 68–95–99.7 rule to answer the question.

49) The amount of Jen's monthly phone bill is normally distributed with a mean of $67 and a standard   49) _____
deviation of $8. What percentage of her phone bills are between $43 and $91?
    A) 68%   B) 99.7%   C) 95%   D) 99.9%

50) The amount of Jen's monthly phone bill is normally distributed with a mean of $70 and a standard   50) _____
deviation of $8. What percentage of her phone bills are between $62 and $78?
    A) 34%   B) 99.7%   C) 95%   D) 68%

51) The lifetimes of light bulbs of a particular type are normally distributed with a mean of 400 hours and a standard deviation of 6 hours. What percentage of the bulbs have lifetimes that lie within 2 standard deviations to either side of the mean?

A) 99.7%   B) 98%   C) 95%   D) 68%

51) _____

52) The systolic blood pressure of a group of 18–year–old women is normally distributed with a mean of

113 mmHg and a standard deviation of 13 mmHg. What percentage of 18–year–old women in this group have a systolic blood pressure that lies within 3 standard deviations to either side of the mean?

A) 68%   B) 95%   C) 34%   D) 99.7%

52) _____

Use the following distribution to answer the question.

Hours of 'life' of light bulbs
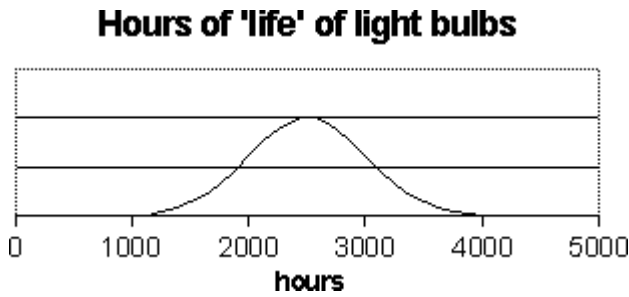
53) Estimate (using area) the relative frequency of values greater than 2000 hours.

A) 0.15   B) 0.85   C) 0.5   D) 0.35

53) _____

54) Estimate the percentage of light bulbs having a life less than 2000 hours.

A) 50%   B) 85%   C) 15%   D) 40%

54) _____

55) Estimate the percentage of light bulbs having a life between 2000 hours and 2500 hours.

A) 50%   B) 65%   C) 35%   D) 85%

55) _____

56) Estimate (using area) the relative frequency of values between 2000 hours and 2500 hours.

A) 0.15   B) 0.5   C) 0.65   D) 0.35

56) _____

Provide an appropriate response.

57) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a king.

A) $\frac{8}{13}$ B) $\frac{4}{13}$ C) $\frac{2}{13}$ D) $\frac{1}{13}$

57) _____

58) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a heart.

A) $\frac{3}{13}$ B) $\frac{17}{52}$ C) $\frac{4}{13}$ D) $\frac{7}{52}$

58) _____

59) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a black card.

A) $\dfrac{15}{26}$ B) $\dfrac{29}{52}$ C) $\dfrac{7}{13}$ D) $\dfrac{4}{13}$

59) _____

60) The events A and B are mutually exclusive. If P(A) = 0.2 and P(B) = 0.4, what is P(A or B)?

A) 0.08   B) 0.6   C) 0.2   D) 0

60) _____

61) Given that P(A or B) = $\dfrac{1}{4}$, P(A) = $\dfrac{1}{6}$, and P(A and B) = $\dfrac{1}{7}$, find P(B).

A) $\dfrac{17}{168}$ B) $\dfrac{47}{84}$ C) $\dfrac{19}{84}$ D) $\dfrac{23}{84}$

61) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

62) Use the following graph, which shows the types of incidents encountered with drivers using cell phones, to find the probability that a randomly chosen incident involves either swerving or almost hitting a car.

62) _____
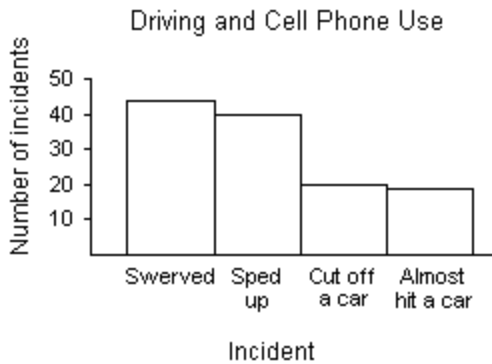
Driving and Cell Phone Use

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

63) The table lists the smoking habits of a group of college students.

63) _____

Sex	Non–smoker	Regular Smoker	Heavy Smoker	Total
Man	135	46	5	186
Woman	187	21	11	219
Total	322	67	16	405

If a student is chosen at random, find the probability of getting someone who is a regular or heavy smoker. Round your answer to three decimal places.

A) 0.239   B) 0.141   C) 0.687   D) 0.205

64) The table lists the smoking habits of a group of college students.

<div style="text-align:right">64) _____</div>

Sex	Non–smoker	Regular Smoker	Heavy Smoker	Total
Man	135	52	5	192
Woman	187	21	5	213
Total	322	73	10	405

If a student is chosen at random, find the probability of getting someone who is a man or a non–smoker. Round your answer to three decimal places.

   A) 0.941   B) 0.820   C) 0.936   D) 0.948

65) The table lists the smoking habits of a group of college students.

<div style="text-align:right">65) _____</div>

Sex	Non–smoker	Regular Smoker	Heavy Smoker	Total
Man	135	41	5	181
Woman	187	21	12	220
Total	322	62	17	401

If a student is chosen at random, find the probability of getting someone who is a man or a woman. Round your answer to three decimal places.

   A) 0.918   B) 0.803   C) 0.197   D) 1

66) The distribution of Master's degrees conferred by a university is listed in the table. (assume that a student majors in only one subject)

<div style="text-align:right">66) _____</div>

Major	Frequency
Mathematics	230
English	206
Engineering	86
Business	176
Education	222

What is the probability that a randomly selected student with a Master's degree majored in English or Mathematics? Round your answer to three decimal places.

   A) 0.474   B) 0.224   C) 0.250   D) 0.526

67) One hundred people were asked, "Do you favor the death penalty?" Of the 33 that answered "yes" to the question, 14 were male. Of the 67 that answered "no" to the question, six were male. If one person is selected at random, what is the probability that this person answered "yes" or was a male?

<div style="text-align:right">67) _____</div>

   A) 0.53   B) 0.67   C) 0.39   D) 0.13