

Name _____

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

Find a z-score satisfying the given condition.

- 1) 20.1% of the total area is to the right of z.

A) 0.84

B) 0.82

C) -0.84

D) 0.83

1) _____

Write the converse, inverse, or contrapositive of the statement as requested.

- 2) If you like me, then I like you.

Converse

A) I don't like you if you don't like me.

B) If I like you, then you like me.

C) If you don't like me, I don't like you.

D) I like you if you don't like me.

2) _____

- 3) If I pass, I'll party.

Contrapositive

A) If I party, then I passed.

B) If I don't pass, I won't party.

C) If I don't party, I didn't pass.

D) I'll party if I pass.

3) _____

- 4) All Border Collies are dogs.

Inverse

A) If it's a dog, it's a Border Collie.

B) If it's not a dog, it's not a Border Collie.

C) If it's not a Border Collie, it's not a dog.

D) If it's a Border Collie, it's not a dog

4) _____

Solve the problem.

- 5) If two fair dice are rolled, find the probability of a sum of 6 given that the roll is a double.

A) $\frac{1}{5}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{6}$

5) _____

- 6) Awards are to be presented to seven people: Jeff, Karen, Lyle, Maria, Norm, Olivia, and Paul. How many different orders are possible for the awards if Karen is to receive the first award and Lyle the last?

A) 120

B) 24

C) 360

D) 840

6) _____

- 7) From a group of 17 women and 14 men, a researcher wants to randomly select 7 women and 7 men for a study. In how many ways can the study group be selected?

A) 22,880

B) 115,315,200

C) 66,745,536

D) 265,182,525

7) _____

- 8) A survey revealed that 25% of people are entertained by reading books, 48% are entertained by watching TV, and 27% are entertained by both books and TV. What is the probability that a person will be entertained by either books or TV? Express the answer as a percentage.

A) 46%

B) 27%

C) 73%

D) 100%

8) _____

- 9) The life span of a certain type of car timing belt, calculated in miles, is normally distributed, with a mean of 90,000 miles and a standard deviation of 7000 miles. If the maker of the timing belt wants less than 4% of the belts to fail while under warranty, for how many miles should the timing belts be guaranteed? 9) _____
- A) Less than 77,750 miles B) Less than 71,450 miles
C) Less than 108,550 miles D) Less than 101,550 miles

- 10) An elevator has 4 passengers and 8 floors. Find the probability that no 2 passengers get off on the same floor considering that it is equally likely that a person will get off at any floor. 10) _____
- A) .410 B) .910 C) .500 D) .610

- 11) A classical music concert is to consist of 2 cello pieces, 4 choral works, and 4 pieces for piano. In how many ways can the program be arranged if a piano piece must come first? 11) _____
- A) 3,628,800 B) 2880 C) 362,880 D) 1,451,520

Construct a truth table for the statement.

- 12) $(p \wedge r) \wedge (\sim r \vee t)$ 12) _____

A)

p	r	t	$(p \wedge r) \wedge (\sim r \vee t)$
T	T	T	F
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	T
F	T	F	F
F	F	T	T
F	F	F	T

B)

p	r	t	$(p \wedge r) \wedge (\sim r \vee t)$
T	T	T	T
T	T	F	F
T	F	T	F
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

- 13) $\sim(\sim(s \vee p))$ 13) _____

A)

s	p	$\sim(\sim(s \vee p))$
T	T	T
T	F	T
F	T	T
F	F	F

B)

s	p	$\sim(\sim(s \vee p))$
T	F	T
F	T	F

C)

s	p	$\sim(\sim(s \vee p))$
T	T	T
T	F	T
F	T	F
F	F	F

D)

s	p	$\sim(\sim(s \vee p))$
T	T	F
T	F	F
F	T	F
F	F	T

- 14) $s \vee \sim(q \wedge p)$ 14) _____

A)

s	q	p	$s \vee \sim(q \wedge p)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	F

B)

s	q	p	$s \vee \sim(q \wedge p)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	T

Given p is true, q is true, and r is false, find the truth value of the statement.

15) $\sim q \wedge (p \wedge \sim r)$

A) True

B) False

15) _____

Find the requested probability.

16) A family has five children. The probability of having a girl is $\frac{1}{2}$. What is the probability of having

at least 4 girls?

A) .1875

B) .0313

C) .3125

D) .1563

16) _____

17) A family has five children. The probability of having a girl is $\frac{1}{2}$. What is the probability of having

exactly 3 girls and 2 boys?

A) .0625

B) .6252

C) .3125

D) .0313

17) _____

18) A child rolls a 6-sided die 6 times. What is the probability of the child rolling exactly four fives?

A) .5360

B) .0080

C) .9688

D) .3125

18) _____

Find the probability.

19) A basketball player hits her shot 41% of the time. If she takes four shots during a game, what is the probability that she hits all four? Express the answer as a percentage, and round to the nearest tenth (if necessary). You may assume the shots are independent events.

A) 2.8%

B) 82%

C) 10.3%

D) 41%

19) _____

Write the negation of the conditional.

20) If you give your jacket to the doorman, he will give you a dirty look.

A) If you give your jacket to the doorman he will not give you a dirty look.

B) You do not give your jacket to the doorman and he will not give you a dirty look.

C) You give your jacket to the doorman and he will not give you a dirty look.

D) You do not give your jacket to the doorman and he will give you a dirty look.

20) _____

Find the median.

21) 3, 3, 27, 23, 39, 49

A) 23

B) 25

C) 24.5

D) 27

21) _____

22) The normal monthly precipitation (in inches) for August is listed for 20 different U.S. cities. Find the median of the data. Round to the nearest hundredth.

3.5 1.6 2.4 3.7 4.1

3.9 1.0 3.6 4.2 3.4

3.7 2.2 1.5 4.2 3.4

2.7 0.4 3.7 2.0 3.6

A) 3.40 in.

B) 3.50 in.

C) 3.45 in.

D) 2.94 in.

22) _____

Use an Euler diagram to determine whether the argument is valid or invalid.

23) Some cars are considered sporty.

Some cars are safe at high speeds.

\therefore Some sports cars are safe at high speeds.

A) Valid

B) Invalid

23) _____

Find the probability of the given event.

24) A bag contains 5 red marbles, 3 blue marbles, and 1 green marble. A randomly drawn marble is not blue. 24) _____

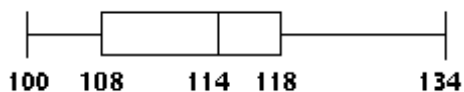
- A) 6 B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{3}{2}$

Construct a boxplot.

25) The highest temperatures ever recorded (in °F) in 32 different U.S. states are shown below. 25) _____
Construct a boxplot for the data set.

100 100 105 105 106 106 107 107
109 110 110 112 112 112 113 113
115 115 116 117 118 118 118 118
118 119 120 121 122 125 128 134

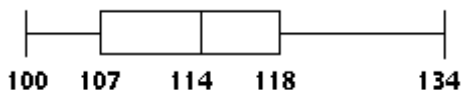
A)



B)



C)



D)



Use a truth table to determine whether the argument is valid.

26) $\sim q \wedge \sim p$ 26) _____

$p \vee \sim q$

$\sim q$

A) Invalid

B) Valid

The table shows, for some particular year, a listing of several income levels and, for each level, the proportion of the population in the level and the probability that a person in that level bought a new car during the year. Given that one of the people who bought a new car during that year is randomly selected, find the probability that that person was in the indicated income category. Round your answer to the nearest hundredth.

Income level	Proportion of population	Probability that bought a new car
\$0 - 4999	5.2%	.02
\$5000 - 9999	6.4%	.03
\$10,000 - 14,999	5.4%	.06
\$15,000 - 19,999	8.7%	.07
\$20,000 - 24,999	9.4%	.09
\$25,000 - 29,999	10.2%	.10
\$30,000 - 34,999	13.8%	.11
\$35,000 - 39,999	10.7%	.13
\$40,000 - 49,999	15.5%	.15
\$50,000 and over	14.7%	.19

27) \$25,000 - \$29,999

A) .14

B) .13

C) .09

D) .07

27) _____

In a certain college, 33% of the physics majors belong to ethnic minorities. Find the probability of the event from a random sample of 10 students who are physics majors.

28) Exactly 2 belong to an ethnic minority.

A) .2156

B) .1929

C) .1990

D) .0028

28) _____

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

Decide whether the statement is true or false.

29) $\{9, 1, 5\} \cup \{9, 1, 5\} = \emptyset$

29) _____

30) $\{0\} \cap \emptyset = \{0\}$

30) _____

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

Find the expected value for the random variable.

31) A business bureau gets complaints as shown in the following table. Find the expected number of complaints per day.

31) _____

Complaints per Day	0	1	2	3	4	5
Probability	.04	.11	.26	.33	.19	.07

A) 2.85

B) 3.01

C) 2.98

D) 2.73

Determine whether the argument is valid or invalid.

32) The Rams will be in the playoffs if and only if Ozzie is an all-star. Mark loves the Rams or Ozzie is an all-star. Mark does not love the Rams. Therefore, the Rams will not be in the playoffs.

32) _____

A) Valid

B) Invalid

Use the method of writing each premise in symbols in order to write a conclusion that yields a valid argument.

- 33) All birds have wings. None of my pets are birds. All animals with wings can flap them. 33) _____
 A) None of my pets can flap their wings. B) All my pets can flap their wings.
 C) No birds can flap their wings. D) All birds can flap their wings.

Find the expected value of the random variable in the experiment.

- 34) Five rats are inoculated against a disease. The number contracting the disease is noted and the experiment is repeated 20 times. Find the probability distribution and give the expected number of rats contracting the disease. 34) _____

Number with Disease	Frequency
0	2
1	4
2	7
3	3
4	1
5	3
Total: 20	

- A) 2.4 B) 2.3 C) 1 D) .9

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

- 35) Two percent of hair dryers produced in a certain plant are defective. Estimate the probability that of 10,000 randomly selected hair dryers, exactly 225 are defective. 35) _____
 A) .0065 B) .0057 C) .0051 D) .0034
- 36) 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. 36) _____
 A) .3508 B) .1492 C) .0901 D) .8508

Let p represent a true statement, while q and r represent false statements. Find the truth value of the compound statement.

- 37) $(p \wedge \sim q) \wedge r$ 37) _____
 A) False B) True
- 38) $\sim p \vee (q \wedge \sim r)$ 38) _____
 A) False B) True

Assume the distribution is normal. Use the area of the normal curve to answer the question. Round to the nearest whole percent.

- 39) The average size of the fish in a lake is 11.4 inches, with a standard deviation of 3.2 inches. Find the probability of catching a fish longer than 17 inches. 39) _____
 A) 8% B) 4% C) 96% D) 5%
- 40) A machine produces bolts with an average diameter of .30 inches and a standard deviation of .01 inches. What is the probability that a bolt will have a diameter greater than .32 inches? 40) _____
 A) 3% B) 2% C) 1% D) 98%

Use the given table to find the indicated probability.

41) The following table contains data from a study of two airlines which fly to Smalltown, USA.

41) _____

	Number of flights arrived on time	Number of flights arrived late
Podunk Airlines	33	6
Upstate Airlines	43	5

P(flight was on Upstate Airlines | flight arrived late)?

A) $\frac{5}{87}$

B) $\frac{5}{48}$

C) $\frac{5}{11}$

D) None of the above

42) People were given three choices of soft drinks and asked to choose one favorite. The following table shows the results.

42) _____

	cola	root beer	lemon-lime
under 21 years of age	40	25	20
between 21 and 40	35	20	30
over 40 years of age	20	30	35

P(person is over 40 \cap person drinks cola)?

A) $\frac{4}{51}$

B) $\frac{4}{17}$

C) $\frac{4}{19}$

D) None of the above

In a certain distribution, the mean is 50 with a standard deviation of 6. Use Chebyshev's theorem to tell the probability that a number lies in the following interval. Round your results to the nearest whole percent.

43) Between 35 and 65

43) _____

A) At least 84%

B) At least 89%

C) At least 86%

D) At least 80%

A die is rolled 20 times and the number of twos that come up is tallied. Find the probability of getting the given result.

44) More than one two

44) _____

A) .982

B) .482

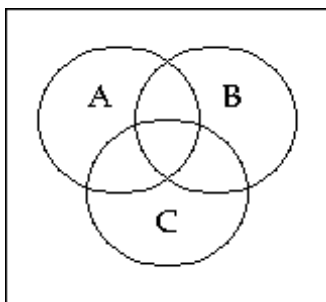
C) .005

D) .870

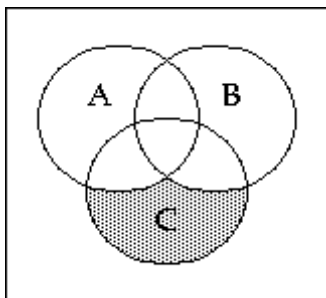
Shade the Venn diagram to represent the set.

45) $(A \cup B \cup C)'$

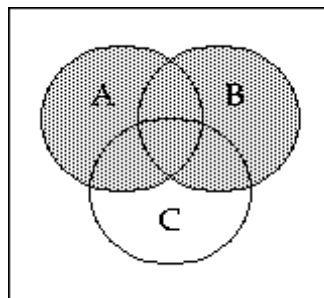
45) _____



A)



B)



Find the probability of the event.

46) On a hospital floor, 16 patients have a disease with a mortality rate of .1. Two of them die.

46) _____

A) .666

B) .275

C) .163

D) .170

Let p represent $7 < 8$, q represent $2 < 5 < 6$, and r represent $3 < 2$. Decide whether the statement is true or false.

47) $(q \vee \sim p) \vee r$

47) _____

A) True

B) False

Find the range for the set of data numbers.

48) 28, 40, 20, 50, 52

48) _____

A) 52

B) 20

C) 32

D) 12

Find the mean.

49) Frank's Furniture employees earned \$201.10, \$537.76, \$221.17, \$247.10, \$287.60, and \$150.28 for last week. Find the mean wage.

49) _____

A) \$317.00

B) \$274.17

C) \$329.00

D) \$411.25

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let U be the smallest possible universal set that includes all of the crops listed; and let A , K , and L be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find the indicated set.

- 50) $A \cap K \cap L$ 50) _____
- A) $\{c, h, n, p, r, s, t, w\}$ B) $\{n, p, s\}$
 C) $\{n, p\}$ D) $\{s\}$

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:

- 51) Less than 15.2 seconds 51) _____
- A) 68% B) 16% C) 50% D) 34%

Use a Venn diagram to answer the question.

- 52) A local television station sends out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 800 responses with the following results: 52) _____
- 240 were interested in an interview show and a documentary, but not reruns;
 32 were interested in an interview show and reruns, but not a documentary;
 112 were interested in reruns but not an interview show;
 192 were interested in an interview show but not a documentary;
 80 were interested in a documentary and reruns;
 48 were interested in an interview show and reruns;
 64 were interested in none of the three.
- How many are interested in exactly one kind of show?
- A) 374 B) 394 C) 364 D) 384

Assume that two marbles are drawn without replacement from a box with 1 blue, 3 white, 2 green, and 2 red marbles. Find the probability of the indicated result.

- 53) Both marbles are green. 53) _____
- A) $\frac{1}{28}$ B) $\frac{1}{4}$ C) $\frac{1}{14}$ D) $\frac{1}{16}$

Find the mean for the frequency distribution. Round to the nearest tenth.

- 54) 54) _____

Value	Frequency
16	1
17	4
23	5
31	5
36	2

- A) 28.4 B) 25.1 C) 7.2 D) 23.3

A company installs 5000 light bulbs, each with an average life of 500 hours, standard deviation of 100 hours, and distribution approximated by a normal curve. Find the approximate number of bulbs that can be expected to last the specified period of time.

55) Between 290 hours and 500 hours

A) 2911

B) 2913

C) 2413

D) 2410

55) _____

Write a negation for the statement.

56) Everyone is asleep.

A) Not everyone is asleep.

B) Nobody is awake.

C) Everyone is awake.

D) Nobody is asleep.

56) _____

A bag contains 6 cherry, 3 orange, and 2 lemon candies. You reach in and take 3 pieces of candy at random. Find the probability.

57) 1 cherry, 2 lemon

A) .0303

B) .0424

C) .0364

D) .3636

57) _____

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

58) A die is rolled 72 times and ten threes come up.

A) .104

B) .544

C) .060

D) .099

58) _____

Find the expected value for the random variable x having this probability function.

59)

$\begin{matrix} \uparrow \\ .5 \\ .4 \\ .3 \\ .2 \\ .1 \end{matrix}$

a b c

a = 20

b = 25

c = 30

A) 27.5

B) 25.5

C) 25

D) 22.5

59) _____

A die is rolled five times and the number of twos that come up is tallied. Find the probability of getting the indicated result.

60) Two comes up zero times.

A) .424

B) .402

C) .0001

D) .161

60) _____

Clarifications for questions on MATH150 practice final exam.

8. A survey revealed that 27% of people are entertained by reading books, 48% are entertained by watching TV, and 25% are entertained by both books and TV. What is the probability that a person will be entertained by either books or TV? Express the answer as a percentage.

A) 46% B) 50% C) 75% D) 100%

45. Shade the Venn diagram to represent the set. $(A \cup B \cup C)'$

59. Find the expected value for the random variable x having this probability function.

x	20	25	30
$P(x)$	0.2	0.5	0.3

A) 27.5 B) 25.5 C) 25 D) 22.5