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

Decide whether the argument is an example of inductive or deductive reasoning.

1) His last four at bats were strikeouts. Therefore, the next will be a strikeout.
   A) Inductive                 B) Deductive

2) Fresh fruit costs more in winter. This is January. Therefore these fresh strawberries will cost more.
   A) Deductive                 B) Inductive

Determine the most probable next term in the sequence.

3) 486, 162, 54, 18, 6
   A) 1     B) 3     C) 2     D) \( \frac{2}{3} \)

4) \( \frac{3}{2}, \frac{5}{4}, \frac{7}{6}, \frac{9}{8}, \frac{11}{10} \)
   A) \( \frac{12}{11} \)     B) \( \frac{13}{12} \)     C) \( \frac{13}{11} \)     D) \( \frac{12}{13} \)

Use the method of Gauss to find the sum.

5) 1 + 2 + 3 + \ldots + 375
   A) 141,376     B) 70,500     C) 35,156.25     D) 70,312.5

Find a pattern and use it to solve the problem.

6) Find the next term: 1, 1, 2, 3, 5, 8, 13
   A) 15     B) 18     C) 16     D) 21

Use the method of successive differences to determine the next term in the sequence.

7) 20, 31, 45, 62, 82, \ldots
   A) 105     B) 102     C) 107     D) 108

Use logic to solve the problem.

8) In India, water lilies grow extremely fast. In one pond, a lily grew so fast that each day it doubled the area it covered. In 28 days it covered the pond. How long would it take 2 such lilies to cover the pond?
   A) 14     B) 7     C) 27     D) 28

Use problem solving strategies to solve the problem.

9) The number of dogs and chickens on a farm add up to 12. The number of legs between them is 28. How many dogs and how many chickens are on the farm if there are at least twice as many chickens as dogs?
   A) 2 dogs, 10 chickens     B) 3 dogs, 9 chickens
   C) 6 dogs, 6 chickens     D) 4 dogs, 8 chickens
10) What's the easiest way to heat a pan of water for 9 minutes when you have only a 6-minute hour-glass timer and a 21-minute hour-glass timer?
   A) Start both timers. When the 6-min one runs out, turn it over. When it runs out again, start heating the water until the 21-min timer runs out.
   B) Can't be done.
   C) Start both timers. When the 6-min timer runs out, start heating the water. Continue until the 21-min timer runs out.
   D) Start the 6-min timer. When it's halfway through start heating the water. When it runs out turn it over and heat the water until it runs out again.

Solve the problem.

11) When 15 gallons of gasoline are put into a car's tank, the indicator goes from $\frac{1}{8}$ of a tank to $\frac{3}{4}$. What is the total capacity of the gasoline tank?
   A) 30 gallons  B) 24 gallons  C) 18 gallons  D) 36 gallons

Determine the number of figures (of any size) in the design.

12) Squares (of any size)

A) 12  B) 17  C) 13  D) 18

List the elements in the set.

13) $\{x \mid x \text{ is an integer between } -2 \text{ and } 2\}$
   A) {-2, -1, 0, 1}  B) {-2, -1, 0, 1, 2}  C) {-1, 0, 1, 2}  D) {-1, 0, 1}

Write the set in set-builder notation.

14) $\{2, 4, 8, 16, 32, \ldots\}$
   A) $\{x \mid x \text{ is a positive multiple of } 2\}$
   B) $\{x \mid x \text{ is an integer power of } 2\}$
   C) $\{x \mid x \text{ is a positive integer power of } 2\}$
   D) $\{x \mid x \text{ is a positive multiple of } 4\}$

Find $n(A)$ for the set.

15) $A = \{3, 3, 4, 4, \ldots, 7, 7\}$
   A) $n(A) = 3$  B) $n(A) = 10$  C) $n(A) = 6$  D) $n(A) = 5$
Determine whether the statement is true or false.

Let \( A = \{1, 3, 5, 7\} \)
\( B = \{5, 6, 7, 8\} \)
\( C = \{5, 8\} \)
\( D = \{2, 5, 8\} \)
\( U = \{1, 2, 3, 4, 5, 6, 7, 8\} \)

16) \( \emptyset \subseteq A \)
   A) True  
   B) False

17) \( D \subseteq B \)
   A) True  
   B) False

Find the number of subsets of the set.

18) \{\text{math, English, history, science, art}\}
   A) 28  
   B) 32  
   C) 16  
   D) 24

Let \( U = \{1, 2, 4, 5, a, b, c, d, e\} \). Find the complement of the set.

19) \( S = \{1, 5, e, d, a\} \)
   A) \{1, 2, 4, b, c\}  
   B) \{2, 3, 4, b, c\}  
   C) \{2, 3, 4, a, b, c\}  
   D) \{2, 4, b, c\}

List the elements in the set.

Let \( U = \{q, r, s, t, u, v, w, x, y, z\} \)
\( A = \{q, s, u, w, y\} \)
\( B = \{q, s, y, z\} \)
\( C = \{v, w, x, y, z\} \)

20) \( B \cap C \)
   A) \{y, z\}  
   B) \{w, y, z\}  
   C) \{y\}  
   D) \{q, s, v, w, x, y, z\}

21) \( C' \cup A' \)
   A) \{q, s, u, v, w, x, y, z\}  
   B) \{w, y\}  
   C) \{s, t\}  
   D) \{q, r, s, t, u, v, x, z\}

22) \( A \cap (B \cup C) \)
   A) \{q, s, u, w, y, z\}  
   B) \{q, s, w, y\}  
   C) \{q, r, w, y, z\}  
   D) \{q, y, z\}

Let \( A \) and \( B \) be sets with cardinal numbers, \( n(A) = a \) and \( n(B) = b \), respectively. Decide whether the statement is true or false.

23) \( n(A \cup B) = n(A) + n(B) - n(A \cap B) \)
   A) True  
   B) False
For the given sets, construct a Venn diagram and place the elements in the proper region.

24) Let \( U = \{c, d, g, h, k, u, q\} \)
   \( A = \{d, h, g, q\} \)
   \( B = \{c, d, h, u\} \)

A) \[ \text{Diagram A} \]
B) \[ \text{Diagram B} \]
C) \[ \text{Diagram C} \]
D) \[ \text{Diagram D} \]
25) Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$
    $A = \{3, 6, 8\}$
    $B = \{4, 6\}$
    $C = \{1, 6, 7, 8\}$

A) $\Omega$

B) $\Omega$

C) $\Omega$

D) $\Omega$
Shade the regions representing the set.

26) \(A' \cap B'\)

Write a description of the shaded region using the symbols \(A, B, C, \cup, \cap, -\), and 

27)

Write a negation for the statement.

28) Some athletes are musicians.

A) Some athletes are not musicians.
B) Not all athletes are musicians.
C) No athlete is a musician.
D) All athletes are musicians.

29) Everyone is asleep.

A) Nobody is asleep.
B) Everyone is awake.
C) Nobody is awake.
D) Not everyone is asleep.

Convert the symbolic compound statement into words.

30) \(p\) represents the statement "It's raining in Chicago."

\(q\) represents the statement "It's windy in Boston."

Translate the following compound statement into words:

\(p \lor q\)

A) It's not the case that it's raining in Chicago and windy in Boston.
B) It's raining in Chicago or it's windy in Boston.
C) If it's raining in Chicago, it's not windy in Boston.
D) It's raining in Chicago and it's windy in Boston.
Let p represent the statement, "Jim plays football", and let q represent the statement "Michael plays basketball". Convert the compound statement into symbols.

31) Jim does not play football and Michael does not play basketball.
   A) \( \neg p \land \neg q \)  
   B) \( \neg(p \land q) \)  
   C) \( p \lor \neg q \)  
   D) \( \neg p \land q \)  

Let p represent a true statement and let q represent a false statement. Find the truth value of the given compound statement.

32) \( p \land q \)
   A) True  
   B) False  

33) \( \neg(p \lor \neg q) \)
   A) False  
   B) True  

Construct a truth table for the statement.

34) \( \neg r \land \neg q \)
   A) \( r \land (\neg r \land \neg q) \)
   B) \( r \land (\neg r \land \neg q) \)
   \[\begin{array}{ccc}
   r & p & r \land (\neg r \land \neg q) \\
   T & T & F \\
   T & F & F \\
   F & T & F \\
   F & F & F \\
   \end{array}\]
   \[\begin{array}{ccc}
   r & p & r \land (\neg r \land \neg q) \\
   T & T & T \\
   T & F & F \\
   F & T & F \\
   F & F & T \\
   \end{array}\]

35) \( s \lor (\neg p \lor \neg s) \)
   A) \( s \land \neg (\neg p \lor \neg s) \)
   B) \( s \land \neg (\neg p \lor \neg s) \)
   \[\begin{array}{ccc}
   s & p & s \lor (\neg p \lor \neg s) \\
   T & T & T \\
   T & F & T \\
   F & T & T \\
   F & F & T \\
   \end{array}\]
   \[\begin{array}{ccc}
   s & p & s \lor (\neg p \lor \neg s) \\
   T & T & F \\
   T & F & T \\
   F & T & T \\
   F & F & T \\
   \end{array}\]

Use De Morgan's laws to write the negation of the statement.

36) A day late and a dollar short.
   A) Not a day late or not a dollar short.  
   B) Not a day late and not a dollar short.  
   C) Not a day late and a dollar short.  
   D) A day late or not a dollar short.  

37) Cats are lazy or dogs aren't friendly.
   A) Cats are lazy and dogs are friendly.  
   B) Cats aren't lazy or dogs are friendly.  
   C) Cats aren't lazy and dogs are friendly.  
   D) Cats aren't lazy or dogs aren't friendly.  

38) It is Saturday and it is not raining.
   A) It is not Saturday or it is not raining.  
   B) It is Saturday and it is raining.  
   C) It is not Saturday or it is raining.  
   D) It is not Saturday and it is raining.
Rewrite the statement using the if...then connective. Rearrange the wording or words as necessary.

39) All chocolate is good.
   A) If it isn’t chocolate, then it isn’t good.  B) Chocolate is good.
   C) If it’s good, then it’s got to be chocolate.  D) If it’s chocolate, then it’s good.

40) I’ll leave when he arrives.
   A) If he arrives, then I’ll leave.  B) I’ll leave when he arrives.
   C) If I leave, then he will leave.  D) If I will leave, then he’ll arrive.

Construct a truth table for the statement.

41) \( p \rightarrow \sim q \)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

A) \( p \rightarrow \sim q \)  B) \( p \rightarrow \sim q \)  C) \( p \rightarrow \sim q \)  D) \( p \rightarrow \sim q \)

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

42) \( \sim q \rightarrow (p \lor r) \)

A) False  B) True

Write the compound statement in symbols.

Let \( r \) = "The food is good."
\( p \) = "I eat too much."
\( q \) = "I'll exercise."

43) The food is good and if I eat too much, then I'll exercise.
   A) \( (r \lor p) \rightarrow q \)  B) \( (r \land p) \rightarrow q \)  C) \( (r \rightarrow p) \lor q \)  D) \( r \land (p \rightarrow q) \)

Write the negation of the conditional. Use the fact that the negation of \( p \rightarrow q \) is \( p \land \sim q \).

44) If you give your hat to the doorman, he will give you a dirty look.
   A) You do not give your hat to the doorman and he will not give you a dirty look.
   B) You give your hat to the doorman and he will not give you a dirty look.
   C) If you give your hat to the doorman he will not give you a dirty look.
   D) You do not give your hat to the doorman and he will not give you a dirty look.

45) If you can’t take the heat, stay out of the kitchen.
   A) You can take the heat but stay out of the kitchen.
   B) You can take the heat and stay out of the kitchen.
   C) You can’t take the heat and do not stay out of the kitchen.
   D) You can take the heat and do not stay off of the kitchen.

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

46) If I were young, I would be happy.
   Converse
   A) If I were not happy, I would not be young.
   B) If I were not young, I would not be happy.
   C) If I were young, I would not be happy.
   D) If I were happy, I would be young.
47) All cats catch birds.
Inverse
A) If it's not a cat, it doesn't catch birds.  
C) If it doesn't catch birds, it's not a cat.  
B) If it catches birds, it's a cat.  
D) Not all cats catch birds.

48) Love is blind.
Contrapositive
A) If it is not blind, then it is not love.  
C) If it is blind then it is not love.  
B) If it is not love, it is not blind.  
D) If it is blind then it is love.

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

49) All businessmen wear suits.
A) Aaron is a suit.
A) Aaron wears a suit.
A) Aaron is a businessman.
A) Valid  
B) Invalid

50) All students who study get better grades.
Roger is a student who studies.
A) Roger will get better grades.
A) Valid  
B) Invalid

Using the 36 possibilities found in the product table for rolling two dice, list and count the outcomes for which the sum (for both dice) is the following.

51) Equal to 8
A) (2,6), (3,5); 2  
C) (2,6), (3,5), (4,4), (4,4), (5,3), (6,2); 6  
B) (2,6), (3,5), (4,4), (5,3), (6,2); 5  
D) (2,6), (3,5), (4,4); 3

Given a group of students: G =\{Allen, Brenda, Chad, Dorothy, Eric\} or G =\{A, B, C, D, E\}, list and count the different ways of choosing the following officers or representatives for student congress. Assume that no one can hold more than one office.

52) A president, a secretary, and a treasurer, if the president must be a woman and the other two must be men
A) BAC, BAE, BCE, DAC, DAE, DCE, BCA, BEA, BEC, DCA, DEA, DEC; 12  
B) BAC, BAE, DAC, DAE; 4 
C) ABD, CBD, EBD; 3  
D) BAC, BAE, BCE, DAC, DAE, DCE; 6

53) Three representatives, if two must be female and one must be male 
A) BDA, BDC; 2  
C) BDA, BDC, BDE, BAD, BCD, BED; 6  
B) BDA, BDC, BDE; 3  
D) BDA, BDC, BDE, DBA, DBC; 5

Solve the problem.

54) A sports shop sold tennis rackets in 3 different weights, 3 types of string, and 4 grip sizes. How many different rackets could be sold?
A) 36 rackets  
C) 10 rackets  
B) 27 rackets  
D) 24 rackets

55) A musician plans to perform 5 selections for a concert. If he can choose from 7 different selections, how many ways can he arrange his program?
A) 35  
C) 16,807  
B) 2520  
D) 21
56) How many different 4-letter radio-station call letters can be made if the first letter must be K or W, repeats are allowed, but the call letters cannot end in an O?  
A) 456,976  
B) 16,900  
C) 33,800  
D) 35,152

57) How many ways can a president, vice-president, and secretary be chosen from a club with 12 members?  
A) 220  
B) 6  
C) 36  
D) 1320

58) There are 5 women running in a race. How many different ways could first, second, and third place finishers occur?  
A) 125  
B) 10  
C) 15  
D) 60

59) There are 13 members on a board of directors. If they must form a subcommittee of 5 members, how many different subcommittees are possible?  
A) 120  
B) 1287  
C) 371,293  
D) 154,440

60) A pool of possible jurors consists of 15 men and 10 women. How many different juries consisting of 5 men and 7 women are possible?  
A) 360,360  
B) 5,200,300  
C) 1,352,078  
D) 3123

61) A poker hand consists of 5 cards dealt from an ordinary deck of 52 playing cards. How many different hands are there consisting of four hearts and one spade?  
A) 9295  
B) 728  
C) 715  
D) 13

If two fair dice, one red and one white, are rolled, in how many ways can the result be obtained?  
62) The product of the numbers on the two dice is a perfect square.  
A) 7 ways  
B) 6 ways  
C) 5 ways  
D) 8 ways

Find the probability.  
63) A bag contains 7 red marbles, 2 blue marbles, and 3 green marbles. What is the probability that a randomly selected marble is blue?  
A) \( \frac{1}{4} \)  
B) \( \frac{2}{9} \)  
C) \( \frac{1}{6} \)  
D) \( \frac{7}{12} \)

64) Two fair 6-sided dice are rolled. What is the probability the sum of the two numbers on the dice is 4?  
A) 3  
B) \( \frac{11}{12} \)  
C) \( \frac{2}{3} \)  
D) \( \frac{1}{12} \)

65) Three fair coins are tossed. Find the probability of getting exactly two tails.  
A) \( \frac{5}{8} \)  
B) \( \frac{1}{2} \)  
C) \( \frac{1}{4} \)  
D) \( \frac{3}{8} \)
Solve the problem.

66) What are the odds in favor of spinning an A on this spinner?
   A) 3:5  B) 6:2  C) 2:6  D) 4:2

67) What are the odds in favor of drawing an even number from these cards?
   A) 3:2  B) 5:2  C) 2:3  D) 2:5

68) The table shows the number of college students who prefer a given pizza topping.

<table>
<thead>
<tr>
<th>toppings</th>
<th>freshman</th>
<th>sophomore</th>
<th>junior</th>
<th>senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>cheese</td>
<td>16</td>
<td>16</td>
<td>21</td>
<td>28</td>
</tr>
<tr>
<td>meat</td>
<td>24</td>
<td>28</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>veggie</td>
<td>16</td>
<td>16</td>
<td>24</td>
<td>28</td>
</tr>
</tbody>
</table>

Find the empirical probability that a randomly selected student prefers cheese toppings.
   A) 0.325  B) 0.112  C) 0.346  D) 0.337

69) Mr. Larsen's third grade class has 22 students, 12 girls and 10 boys. Two students must be selected at random to be in the fall play. What is the probability that no boys will be chosen? Order is not important.
   A) \( \frac{1}{6} \)  B) \( \frac{2}{7} \)  C) \( \frac{5}{6} \)  D) \( \frac{6}{11} \)

Find the probability.

70) A fair die is rolled. What is the probability of rolling a 3 or a 6?
   A) 2  B) \( \frac{1}{3} \)  C) \( \frac{1}{6} \)  D) \( \frac{1}{36} \)
Find the indicated probability.

71) The age distribution of students at a community college is given below.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of students (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 21</td>
<td>400</td>
</tr>
<tr>
<td>21-25</td>
<td>403</td>
</tr>
<tr>
<td>26-30</td>
<td>219</td>
</tr>
<tr>
<td>31-35</td>
<td>56</td>
</tr>
<tr>
<td>Over 35</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>1107</td>
</tr>
</tbody>
</table>

A student from the community college is selected at random. Find the probability that the student is between 26 and 35 inclusive. Round approximations to three decimal places.

A) 0.051    B) 0.198    C) 275     D) 0.248

72) The distribution of B.A. degrees conferred by a local college is listed below, by major.

<table>
<thead>
<tr>
<th>Major</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>2073</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2164</td>
</tr>
<tr>
<td>Chemistry</td>
<td>318</td>
</tr>
<tr>
<td>Physics</td>
<td>856</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>1358</td>
</tr>
<tr>
<td>Business</td>
<td>1676</td>
</tr>
<tr>
<td>Engineering</td>
<td>868</td>
</tr>
<tr>
<td></td>
<td>9313</td>
</tr>
</tbody>
</table>

What is the probability that a randomly selected degree is in English or Mathematics?

A) 0.424    B) 0.455    C) 0.010    D) 0.517

73) A card is drawn at random from a standard 52-card deck. Find the probability that the card is neither an ace nor a heart.

A) \(\frac{9}{13}\)    B) \(\frac{21}{26}\)    C) \(\frac{35}{52}\)    D) \(\frac{4}{13}\)

74) A bag contains 5 red marbles, 4 blue marbles, and 1 green marble. If a marble is selected at random, what is the probability that it is not blue?

A) \(\frac{5}{3}\)    B) \(\frac{2}{5}\)    C) \(\frac{3}{5}\)    D) 6

Determine whether the events are independent.

75) Two cards are selected at random from a standard deck of 52 cards without replacement. Are the events "ace on the first draw" and "ace on the second draw" independent?

A) No    B) Yes
Find the indicated probability.

76) The table below shows the soft drink preferences of people in three age groups.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>cola</th>
<th>root beer</th>
<th>lemon-lime</th>
</tr>
</thead>
<tbody>
<tr>
<td>under 21 years of age</td>
<td>40</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>between 21 and 40</td>
<td>35</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>over 40 years of age</td>
<td>20</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

If one of the 255 subjects is randomly selected, find the probability that the person is over 40 and drinks cola.

A) \( \frac{4}{51} \)  
B) \( \frac{4}{17} \)  
C) \( \frac{4}{19} \)  
D) None of the above is correct.

77) The table below shows the soft drinks preferences of people in three age groups.

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<td>between 21 and 40</td>
<td>35</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>over 40 years of age</td>
<td>20</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

If one of the 255 subjects is randomly selected, find the probability that the person is over 40 years of age given that they drink root beer.

A) \( \frac{6}{17} \)  
B) \( \frac{5}{17} \)  
C) \( \frac{2}{5} \)  
D) None of the above is correct.

78) The table below shows the soft drinks preferences of people in three age groups.

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<td>20</td>
<td>30</td>
</tr>
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<td>20</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

If one of the 255 subjects is randomly selected, find the probability that the person drinks root beer given that they are over 40.

A) \( \frac{2}{5} \)  
B) \( \frac{6}{17} \)  
C) \( \frac{2}{17} \)  
D) None of the above is correct.

Find the probability.

79) Find the probability of correctly answering the first 4 questions on a multiple choice test if random guesses are made and each question has 3 possible answers.

A) \( \frac{3}{4} \)  
B) \( \frac{1}{64} \)  
C) \( \frac{1}{81} \)  
D) \( \frac{4}{3} \)

80) In one town, 70% of adults have health insurance. What is the probability that 8 adults selected at random from the town all have health insurance?

A) 0.114  
B) 0.7  
C) 0.058  
D) 5.6
Use the general multiplication rule to find the indicated probability.

81) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black.

A) \frac{25}{102} \quad B) \frac{1}{2652} \quad C) \frac{25}{51} \quad D) \frac{13}{51}

82) Two marbles are drawn without replacement from a box with 3 white, 2 green, 2 red, and 1 blue marble. Find the probability that both marbles are white.

A) \frac{3}{28} \quad B) \frac{3}{8} \quad C) \frac{9}{56} \quad D) \frac{3}{32}

Find the conditional probability.

83) If three cards are drawn at random without replacement from a standard deck, find the probability that the third card is a face card, given that the first card was a queen and the second card was a 5.

A) \frac{11}{50} \quad B) \frac{3}{13} \quad C) \frac{6}{25} \quad D) \frac{1}{5}

Find the indicated probability.

84) A sample of 4 different calculators is randomly selected from a group containing 19 that are defective and 36 that have no defects. What is the probability that at least one of the 4 calculators in the sample is defective?

A) 0.190 \quad B) 0.173 \quad C) 0.827 \quad D) 0.816

Solve the problem.

85) If 5 apples in a barrel of 25 apples are rotten, what is the expected number of rotten apples in a random sample of 2 apples?

A) \frac{4}{5} \quad B) \frac{2}{5} \quad C) 1 \quad D) \frac{3}{5}

86) If 3 balls are drawn at random from a bag containing 3 red and 4 blue balls, what is the expected number of red balls in the sample?

A) 1.39 \quad B) 1.29 \quad C) 0.89 \quad D) 1.54

Find the expected value of the random variable.

87) The random variable X is the number of people who have a college degree in a randomly selected group of four adults from a particular town. Its probability distribution is given in the table.

<table>
<thead>
<tr>
<th>x</th>
<th>P(X = x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.1296</td>
</tr>
<tr>
<td>1</td>
<td>0.3456</td>
</tr>
<tr>
<td>2</td>
<td>0.3456</td>
</tr>
<tr>
<td>3</td>
<td>0.1536</td>
</tr>
<tr>
<td>4</td>
<td>0.0256</td>
</tr>
</tbody>
</table>

A) 1.60 \quad B) 1.73 \quad C) 2.00 \quad D) 1.50
Construct a stem and leaf display for given data.
88) Here are the final scores for the last 16 games played by the local basketball team.

45 54 53 65
67 75 57 59
87 86 79 74
67 75 87 65

A) 415
   5 3 4 7 9
   6 5 5 7 7
   7 4 5 5 9
   8 6 7 7
B) 445
   5 5 5 4 57 59
   6 6 5 6 7
   7 7 4 7 5 7 9
   8 8 6 8 7
C) 45
   5 3 4 7 9
   6 6 5 7
   7 4 5 9
   8 6 7
D) 445
   5 5 5 4 57 59
   6 6 5 6 7
   7 7 4 7 5 7 9
   8 8 6 8 7

Construct the specified histogram.
89) The frequency table below shows the number of days off in a given year for 30 police detectives.

<table>
<thead>
<tr>
<th>Days off</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>10</td>
</tr>
<tr>
<td>2 - 3</td>
<td>1</td>
</tr>
<tr>
<td>4 - 5</td>
<td>7</td>
</tr>
<tr>
<td>6 - 7</td>
<td>7</td>
</tr>
<tr>
<td>8 - 9</td>
<td>1</td>
</tr>
<tr>
<td>10 - 11</td>
<td>4</td>
</tr>
</tbody>
</table>

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

Find the mean of the set of data.
90) 1.202, 12.337, 4.185, 7.194, 5.294

Round your answer to three decimal places.
A) 7.553  B) 6.042  C) 1.299  D) 5.800

Find the median.
91) 6, 2, 26, 14, 49, 42, 31
A) 26  B) 31  C) 24  D) 14

Find the mode or modes.
92) 79, 42, 32, 42, 29, 79
A) 42  B) 79, 42  C) 79  D) 50.5

Find the mean for the given frequency distribution.
93) Find the approximate mean for the grouped frequency distribution. Use the class midpoint to represent each class. Round your answer to two decimal places.

<table>
<thead>
<tr>
<th>Score</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 - 69</td>
<td>3</td>
</tr>
<tr>
<td>70 - 79</td>
<td>12</td>
</tr>
<tr>
<td>80 - 89</td>
<td>7</td>
</tr>
<tr>
<td>90 - 99</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>74.50</td>
<td></td>
</tr>
<tr>
<td>78.12</td>
<td></td>
</tr>
<tr>
<td>79.50</td>
<td></td>
</tr>
<tr>
<td>77.83</td>
<td></td>
</tr>
</tbody>
</table>

Find the median for the given frequency distribution.
94) Value | Frequency |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>80</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Find the range for the set of data given.
95) Value | Frequency |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>29</td>
<td>5</td>
</tr>
<tr>
<td>35</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>
Find the standard deviation. Round to one more place than the data.

<table>
<thead>
<tr>
<th>Temp. °F</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>9</td>
</tr>
<tr>
<td>71</td>
<td>18</td>
</tr>
<tr>
<td>72</td>
<td>16</td>
</tr>
<tr>
<td>73</td>
<td>12</td>
</tr>
<tr>
<td>74</td>
<td>2</td>
</tr>
</tbody>
</table>

A) 1.1 B) 86.9 C) 71.6 D) 0.6

Use Chebyshev's theorem to solve the problem.

97) In a certain distribution of numbers, the mean is 50 and the standard deviation is 6. What can you say about the percentage of numbers that lie between 38 and 62?
A) at most 25% B) at least 75% C) at most 75% D) at least 50%

Find the standard deviation for the given data. Round your final answer to one more decimal place than that used for the observations.

98) The amount of sun-induced expansion (in mm) of a steel I-beam 10 m long before expansion:
7.83, 7.84, 7.80, 7.70, 7.83
A) 0.058 mm B) 0.089 mm C) 0.116 mm D) 0.003 mm

Solve the problem.

99) Elizabeth and Angela skate for their college speed-skating team. In the last race, Elizabeth skated the 500-meter race in 59 seconds. The average for this race is 65 seconds with a standard deviation of 4.0 seconds. Angela skated the 1000-meter race in 135 seconds. The average for this race is 140 seconds with a standard deviation of 10.0 seconds. Find the z-score for each skater. Relatively speaking, which skater had the faster time?
A) -6.0, -5.0, Angela B) -1.5, -0.5, Angela
C) -6.0, -5.0, Elizabeth D) -1.5, -0.5, Elizabeth

100) Martin scored 41 points on a quiz. The average score for his class was 39 with a standard deviation of 2.4. Martin’s brother Jeff who is in a different class also had a quiz. He scored 30. The average score in Jeff’s class was 26 with a standard deviation of 1.9. Find the z-score for each person. Relatively speaking, who did better?
A) 2.0, 4.0, Martin B) 0.83, 2.11, Jeff
C) 2.0, 4.0, Jeff D) 0.83, 2.11, Martin

Solve the problem. Assume that simple interest is being calculated in each case. Round the answer to the nearest cent unless otherwise indicated.

101) Allan borrowed $3900 from his father to buy a car. He repaid him after 9 months with interest of 7% per year. Find the total amount he repaid.
A) $4082.00 B) $204.75 C) $4173.00 D) $4104.75

102) Martin takes out a simple interest loan at 4%. After 10 months the amount of interest on the loan is $80.93. What was the amount of the loan? Round to the nearest dollar.
A) $2768 B) $2389 C) $2428 D) $24

Find the compound interest earned by the deposit. Round to the nearest cent.

103) $7824 at 4% compounded continuously for 4 years
A) $3389.90 B) $2122.03 C) $1357.55 D) $9181.55
Use the compound interest formula to compute the future value of the investment.

104) $5500 at 8% compounded monthly for 7 years
   A) $5761.86        B) $196,473.48       C) $9610.82       D) $7688.66

Solve the problem.

105) An item is purchased for $2500 with a down payment of $500. There is a finance charge of $150.

Find the monthly payment if 20 payments are made.
   A) $132.50          B) $107.50        C) $100.00        D) None of the above is correct.

106) The cash price of a fitness system is $659.99. The customer paid $115 as a down payment. The
remainder will be paid in 36 monthly installments of $19.16 each. Find the amount of the finance
charge.
   A) $689.76          B) $141.17         C) $144.77        D) $29.77

Solve the problem. Use an annual percentage rate table if necessary.

107) Jennifer has a 60–month fixed installment loan, with a monthly payment of $168.01. The amount
she borrowed was $8000. Instead of making her 12th payment, Jennifer is paying the remaining
balance on the loan. What is the total amount due to pay off the balance (use the actuarial method)?
   A) $6765.67        B) $6687.65        C) $6855.67        D) $6404.13

Solve the problem. If necessary, use the table of monthly payments below. Round your answer to the nearest cent.

**Monthly Payments to Repay Principal and Interest on a $1000 Mortgage**

<table>
<thead>
<tr>
<th>Annual Rate (r)</th>
<th>Term of Mortgage (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td>8.0%</td>
<td>$20.27639</td>
</tr>
<tr>
<td>8.5%</td>
<td>20.51653</td>
</tr>
<tr>
<td>12.0%</td>
<td>22.24445</td>
</tr>
</tbody>
</table>

108) Find the total monthly payment, including taxes and insurance, on the following fixed-rate mortgage.

   Amount of loan: $105,250
   Interest rate: 10%
   Term of loan: 25 years
   Annual taxes: $3001
   Annual insurance: $466
   A) $1245.32        B) $1263.53        C) $1294.05        D) $956.41

Find the total return earned by the given bond.

109)

<table>
<thead>
<tr>
<th>Face Value</th>
<th>Annual Interest Rate</th>
<th>Term to Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$9000</td>
<td>6.5%</td>
<td>10 years</td>
</tr>
<tr>
<td>A) $58,500</td>
<td>B) $585,000</td>
<td>C) $5850</td>
</tr>
</tbody>
</table>
Solve the problem.

110) The following information on Company X appears in a stock table. Find the basic cost (ignoring any broker’s fees) to purchase 130 shares of Company X at the day’s closing price.

<table>
<thead>
<tr>
<th>YTD</th>
<th>52-WEEK</th>
<th>STOCK (SYM)</th>
<th>DIV</th>
<th>PE</th>
<th>VOL</th>
<th>NET</th>
</tr>
</thead>
<tbody>
<tr>
<td>%CHG</td>
<td>HI</td>
<td>LO</td>
<td>DIV</td>
<td>%</td>
<td>100s</td>
<td>CLOSE</td>
</tr>
<tr>
<td>1</td>
<td>36.32</td>
<td>28.99</td>
<td>0.41</td>
<td>1.2</td>
<td>6592</td>
<td>33.60</td>
</tr>
</tbody>
</table>

A) $3768.70  B) $4721.60  C) $33.60  D) $4368.00

111) Find the future value (to the nearest dollar) of the following inflation-adjusted retirement account. Deposits are made at the end of each year.

- Annual inflation rate: 1%
- Initial deposit: $2500
- Annual rate of return: 5%
- Number of years: 20

A) $97,630  B) $89,569  C) $85,091  D) $103,005

For the given investment, assume that there is no opportunity for reinvestment of returns. Find the monthly return, annual return, or annual percentage return as indicated.

112) Amount Invested  Monthly Percentage Return
$4281  0.57%

Find the annual percentage return.

A) 292.82%  B) 6.84%  C) 7.06%  D) 5.7%

Assume that the given mutual fund investment earns monthly returns that are reinvested and subsequently earn at the same rate. Find the beginning value of the investment, first monthly return, or effective annual rate of return as indicated.

113) Beginning NAV  Number of Shares Purchased  Monthly Percentage Return
$13.74  372  1.5%

Find the beginning value of the investment.

A) $76.67  B) $5187.95  C) $13.74  D) $5111.28

Solve the problem.

114) For the given stock investment, find the capital gain:

<table>
<thead>
<tr>
<th>Number of Shares</th>
<th>Purchase Price Per Share</th>
<th>Dividend Per Share</th>
<th>Sale Price Per Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>$22</td>
<td>$2</td>
<td>$45</td>
</tr>
</tbody>
</table>

A) $3450  B) $3750  C) $23  D) $6750