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

Write a description of the set.

1) \[ \{36, 38, 40, 42, \ldots, 100\} \]
   A) all even numbers
   B) even numbers from 36 to 100
   C) numbers from 36 to 100
   D) odd numbers from 36 to 100

Find the cardinal number for the set.

2) \( \{2, 4, 6, \ldots, 60\} \)
   A) 20
   B) 60
   C) 30
   D) 15

Place the various elements in the proper regions of the following Venn diagram.

3) Let \( U = \{8, 9, 10, 11, 12, 13, 14\} \) and \( A = \{8, 9, 12\} \). Find \( A' \) and place the elements in the proper region.
   A) \( A' = \{8, 9, 10, 11, 12, 13, 14\} \)
   B) \( A' = \{11, 12, 13, 14\} \)
   C) \( A' = \{10, 11, 13, 14\} \)
   D) \( A' = \{8, 9, 12\} \)
Let \( U = \{q, r, s, t, u, v, w, x, y, z\} \)
\[ A = \{q, s, u, w, y\} \]
\[ B = \{q, s, y, z\} \]
\[ C = \{v, w, x, y, z\} \]. List the elements in the set.

4) \((A \cap C)'\)
   \[ A) \{q, r, s, t, u, v, w, x, y, z\} \]
   \[ B) \{q, r, s, t, u, v, x, z\} \]
   \[ C) \{q, s, y, z\} \]
   \[ D) \{w, y\} \]

5) \(A \cap B'\)
   \[ A) \{q, s, t, u, v, w, x, y\} \]
   \[ B) \{t, v, x\} \]
   \[ C) \{u, w\} \]
   \[ D) \{r, s, t, u, v, w, x, z\} \]

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

Use the Venn diagram to list the elements of the set in roster form.

7) 

8) 

(A \cap B')
   \[ A) \{11, 12, 14, 15, 16\} \]
   \[ B) \{11, 12, 14, 15, 16, 18, 19\} \]
   \[ C) \{18, 19\} \]
   \[ D) \{13, 17\} \]

(A \cup B')
   \[ A) \{13, 17\} \]
   \[ B) \{11, 12, 13, 14, 15, 16, 17\} \]
   \[ C) \{11, 12, 14, 15, 16\} \]
   \[ D) \{18, 19\} \]
Use the Venn diagram shown to answer the question.

9) Which regions represent set \( D \cup F \)?
   A) III
   B) VIII
   C) I, II, IV, V, VI, VII
   D) I, II, IV, V, VI, VII, VIII

9) ______

Construct a Venn diagram illustrating the given sets.

10) \( A = \{4, 5, 6, 7, 8, 9\} \), \( B = \{3, 4, 5, 6, 10\} \), \( C = \{2, 3, 4, 5, 9\} \), \( U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \)

10) ______
Use the accompanying Venn diagram that shows the number of elements in regions I through IV to answer the question.

11) How many elements belong to set B but not set A?
   A) 9  B) 13  C) 12  D) 10

Form the negation of the statement.

12) Copenhagen is not the capital of Italy.
   A) It is not true that Copenhagen is not the capital of Italy.
   B) It is true that Italy is not the capital of Copenhagen.
   C) It is true that Copenhagen is not the capital of Italy.
   D) It is not true that Italy is not the capital of Copenhagen.

Given that p and q each represents a simple statement, write the indicated compound statement in its symbolic form.

13) p: He works out.
   q: He builds up his strength.
   He works out or he builds up his strength.
   A) p ∧ q  B) p ∨ ¬q  C) p ∨ q  D) p → q

Solve the problem.

14) 60% of what number is 87?
   A) 145  B) 52.2  C) 14.5  D) 1450

15) 6 is what percent of 25?
   A) 24%  B) 0.24%  C) 2.4%  D) 2400%
16) Jeans with an original price of $65 are on sale at 25% off. What is the sale price of the jeans? (Round to the nearest cent, if necessary.)
   A) $63.38  B) $16.25  C) $48.75  D) $81.25

17) A dress regularly sells for $137. The sale price is $101. Find the percent decrease of the sale price from the regular price.
   A) 280.6%  B) 26.3%  C) 35.6%  D) 73.7%

Use dimensional analysis to convert the unit indicated.
18) 18 cm to in.
   A) 45.72 in.  B) 7.09 in.  C) 0.14 in.  D) 0.02 in.

19) 39 km to mi
   A) 62.4 mi  B) 24.4 mi  C) 0.016 mi  D) 0.041 mi

20) 8 ft to m
   A) 8.9 m  B) 21.6 m  C) 2.4 m  D) 0.1 m

Convert the given Celsius temperature to its equivalent temperature on the Fahrenheit scale. Where appropriate, round to the nearest tenth of a degree.
21) 22°C
   A) 71.6°F  B) 7.6°F  C) -4.6°F  D) 31°F

Convert the given Fahrenheit temperature to its equivalent temperature on the Celsius scale. Where appropriate, round to the nearest tenth of a degree.
22) 40°F
   A) 104°C  B) 14.4°C  C) 4.4°C  D) 54.2°C

Find the measure of the angle in which ?° appears.
23)

\[ ? \quad 25° \]

A) 120°  B) 65°  C) 155°  D) 60°

Find the measures of angles 1, 2, and 3.
24)

\[ 60° \]

A) \( \angle 1 = 30°; \angle 2 = 90°; \angle 3 = 30° \)  B) \( \angle 1 = 120°; \angle 2 = 60°; \angle 3 = 120° \)

C) \( \angle 1 = 30°; \angle 2 = 90°; \angle 3 = 60° \)  D) \( \angle 1 = 30°; \angle 2 = 120°; \angle 3 = 30° \)
The figure shows two parallel lines intersected by a transversal. One of the angle measures is given. Find the measure of the indicated angle.

25) \[ \angle 2 \]

25) ______

Find the measure of \( \angle 2 \).
A) 31°  B) 59°  C) 21°  D) 121°

Use similar triangles and the fact that corresponding sides are proportional to find the length of the side marked with an x.

26) \[ \frac{11 \text{ in.}}{2 \text{ in.}} = \frac{x}{5 \text{ in.}} \]

26) ______

A) 0.9 in.  B) 110 in.  C) 4.4 in.  D) 27.5 in.

Use the number of sides to name the polygon.

27) \[ \text{Octagon} \]

27) ______

A) octagon  B) quadrilateral  C) heptagon  D) hexagon

Use formulas to find the area of the figure.

28) \[ \text{Area} = \frac{1}{2} \times \text{base} \times \text{height} \]

28) ______

A) 189.8 sq. yd  B) 481.8 sq. yd  C) 292 sq. yd  D) 240.9 sq. yd
Solve the problem. Round all circumference and area calculations to the nearest whole number.

29) How many flowers spaced every 6 inches are needed to surround a circular garden with a 25-foot radius? Round all circumference and area calculations to the nearest whole number.
   A) 471 flowers
   B) 314 flowers
   C) 942 flowers
   D) 158 flowers

30) Use two formulas for volume to find the volume of the figure. Round the answer to the nearest whole number.

\[ \text{Volume} = \frac{1}{3} \pi r^2 h \]

A) \(1591 \text{ cm}^3\)
B) \(54,597 \text{ cm}^3\)
C) \(3335 \text{ cm}^3\)
D) \(2309 \text{ cm}^3\)

Solve the problem by applying the Fundamental Counting Principle with two groups of items.

31) Jamie is joining a music club. As part of her 4–CD introductory package, she can choose from 12 rock selections, 10 alternative selections, 7 country selections and 5 classical selections. If Jamie chooses one selection from each category, how many ways can she choose her introductory package?
   A) 4200
   B) 34
   C) 420
   D) 3400

32) Use the spinner below to answer the question. Assume that it is equally probable that the pointer will land on any one of the five numbered spaces. If the pointer lands on a borderline, spin again.

33) A single die is rolled twice. Find the probability of getting two numbers whose sum is less than 13.
   A) \(1 \over 2\)
   B) 0
   C) 1
   D) \(1 \over 4\)
Use the empirical probability formula to solve the exercise. Express the answer as a fraction. Then express the probability as a decimal, rounded to the nearest thousandth, if necessary.

34) In 1999 the stock market took big swings up and down. A survey of 996 adult investors asked how often they tracked their portfolio. The table shows the investor responses. What is the probability that an adult investor tracks his or her portfolio daily?

<table>
<thead>
<tr>
<th>How frequently?</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>222</td>
</tr>
<tr>
<td>Weekly</td>
<td>281</td>
</tr>
<tr>
<td>Monthly</td>
<td>292</td>
</tr>
<tr>
<td>Couple times a year</td>
<td>140</td>
</tr>
<tr>
<td>Don't track</td>
<td>61</td>
</tr>
</tbody>
</table>

A) \( \frac{292}{996}; 0.293 \)  
B) \( \frac{281}{996}; 0.282 \)  
C) \( \frac{222}{996}; 0.223 \)  
D) \( \frac{140}{996}; 0.141 \)

The chart below shows the percentage of people in a questionnaire who bought or leased the listed car models and were very satisfied with the experience.

Model A  81%  
Model B  79%  
Model C  73%  
Model D  61%  
Model E  59%  
Model F  57%

35) With which model was the greatest percentage satisfied? Estimate the empirical probability that a person with this model is very satisfied with the experience. Express the answer as a fraction with a denominator of 100.

A) Model A: \( \frac{0.81}{100} \)  
B) Model F: \( \frac{57}{100} \)  
C) Model F: \( \frac{0.57}{100} \)  
D) Model A: \( \frac{81}{100} \)

You are dealt one card from a 52-card deck. Find the probability that you are dealt:

36) a numbered card or a club  
A) \( \frac{33}{52} \)  
B) \( \frac{23}{52} \)  
C) \( \frac{53}{52} \)  
D) \( \frac{10}{13} \)

Solve the problem that involves probabilities with events that are not mutually exclusive.

37) The physics department of a college has 5 male professors, 7 female professors, 16 male teaching assistants, and 9 female teaching assistants. If a person is selected at random from the group, find the probability that the selected person is a teaching assistant or a female.

A) \( \frac{25}{37} \)  
B) \( \frac{32}{37} \)  
C) \( \frac{23}{37} \)  
D) \( \frac{16}{37} \)

38) There are 37 chocolates in a box, all identically shaped. There are 10 filled with nuts, 12 with caramel, and 15 are solid chocolate. You randomly select one piece, eat it, and then select a second piece. Find the probability of selecting 2 solid chocolates in a row.

A) \( \frac{225}{1369} \)  
B) \( \frac{35}{222} \)  
C) \( \frac{5}{444} \)  
D) \( \frac{210}{1369} \)
Numbered disks are placed in a box and one disk is selected at random.

39) If there are 6 red disks numbered 1 through 6, and 8 yellow disks numbered 7 through 14, find the probability of selecting a red disk, given that an odd-numbered disk is selected.

A) \( \frac{3}{14} \)  
B) \( \frac{2}{7} \)  
C) \( \frac{3}{7} \)  
D) \( \frac{4}{7} \)

The exercise presents numerical information. Describe the population whose properties are analyzed by the data.

40) During 2001, 53% of households in City A were online.

A) online households in the country  
B) households in the country  
C) online households in City A  
D) households in City A

Find the mean for the group of data items. Round to the nearest hundredth, if necessary.

41) 5.4, 4, 3.4, 8.4, 5.4, 1.1, 5.4, 9.5, 9.5, 7.5

A) 6.62  
B) 4.88  
C) 5.01  
D) 5.96

Find the median for the group of data items.

42) 95, 95, 94, 39, 74, 95

A) 95  
B) 94  
C) 94.5  
D) 39

Find the mode for the group of data items. If there is no mode, so state.

43) 97, 97, 94, 44, 74, 97

A) 94  
B) 44  
C) no mode  
D) 97

Find the range for the group of data items.

44) 5, 17, 5, 17, 5, 17, 5, 17

A) 17  
B) 11  
C) 12  
D) 22

Find the standard deviation for the group of data items (to the nearest hundredth).

45) 11, 12, 13, 14, 15

A) 1.25  
B) 1.58  
C) 0  
D) 2.5