Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the answer sheet. Where applicable, answers may be left in terms of \( \pi \) or in radical form. [60]

1. A letter is chosen at random from the word "SPINNER." Find the probability that the letter chosen is an N.

2. What is the multiplicative inverse of \( \frac{3}{4} \)?

3. Solve for \( x \): \( \frac{3}{2} x = 12 \)

4. A 10-foot flagpole casts a shadow of 15 feet on level ground. A 6-foot man is standing next to the flagpole. Find the number of feet in the length of the shadow cast by the man.

5. Let \( p \) represent "The cake is chocolate" and let \( q \) represent "The ice cream is vanilla." Using \( p \) and \( q \), write in symbolic form: "The cake is chocolate and the ice cream is not vanilla."

6. What is the greatest whole number that satisfies the inequality \( 3x - 1 < 8 \)?

7. Solve for \( x \): \( 3(x + 5) + x = 7 \)

8. In the accompanying diagram of circle \( O, \overline{AB} \) and \( \overline{AC} \) are chords. If the measure of arc \( BC \) is 80, find \( m \angle BAC \).

9. Two numbers are in the ratio 1:3. If the sum of the two numbers is increased by 2, the result is 18. Find the smaller number.

10. In the accompanying diagram, transversal \( t \) intersects parallel lines \( l \) and \( m \). If \( m \angle 1 = 2x + 40 \) and \( m \angle 2 = 3x + 20 \), find the value of \( x \).

11. Solve for \( x \): \( 0.3x + 0.2 = 5 \)
12. Solve the following system of equations for y:

\[2x + y = 2\]
\[-2x - 3y = -6\]

13. In the accompanying diagram, lines RS and LM intersect at E. If \(m \angle REL = 4x\) and \(m \angle SRM = x + 120\), find \(x\).

14. Emily has 5 lemon gumdrops, 8 strawberry gumdrops, and 7 grape gumdrops. If she selects one gumdrop at random, what is the probability that it will be either lemon or strawberry?

15. Solve for \(c\):

\[\frac{c - 2}{4} = \frac{3}{2}\]

16. Express as a trinomial:

\[(2x - 3)(x + 4)\]

17. What is the radius of a circle whose circumference is \(16\pi\)?

18. If \(x = 3\) and \(y = -5\), find the value of \(x - y^2\).

19. The measures of two complementary angles are represented by \(x + 5\) and \(4x - 15\). Find the value of \(x\).

20. Factor:

\[9x^2 - 1\]

21. If a base angle of an isosceles triangle measures 35, find the measure of the vertex angle.

**Directions (22-35): For each question chosen, write on the answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.**

22. What is the product of \(3x^4\) and \(2x^3\)?

(1) \(5x^7\)  (2) \(6x^7\)  (3) \(6x^{12}\)  (4) \(5x^{12}\)

23. Which point lies on the graph of the equation \(3x + y = 9\)?

(1) \((-1,9)\)  (2) \((9,0)\)  (3) \((1,1)\)  (4) \((0,9)\)

24. If \(dx - 2 = h\), then \(x\) is equal to

(1) \(h + \frac{2}{d}\)

(2) \(\frac{h - 2}{d}\)  (3) \(\frac{h + 2}{d}\)  (4) \(\frac{h}{d} + 2\)
25. Which statement is true if $p$ is false and $q$ is true?

1. $\neg p \rightarrow q$
2. $q \rightarrow p$
3. $p \lor \neg q$
4. $p \land q$

26. Which inequality is represented by the accompanying graph?

-2 -1 0 1 2 3 4 5

1. $-1 \leq x \leq 4$
2. $-1 < x < 4$
3. $-1 \leq x \leq 4$
4. $-1 < x < 4$

27. In Syracuse, high temperatures for six days were recorded at 90°, 84°, 84°, 78°, 73°, and 71°. What is the median temperature for these days?

1. 84°
2. 81°
3. 80°
4. 78°

28. What is the sum of $\frac{2x}{3}$ and $\frac{x}{4}$?

1. $\frac{3x}{7}$
2. $\frac{11x}{7}$
3. $\frac{2x^2}{12}$
4. $\frac{11x}{12}$

29. How many different ways may a set of 4 books be arranged side by side on a shelf?

1. 16
2. 256
3. 24
4. 4

30. What is the length of the hypotenuse of a right triangle with legs of lengths 7 and 8?

1. 9
2. 15
3. $\sqrt{15}$
4. $\sqrt{113}$

31. The expression $\sqrt{50}$ is equivalent to

1. $5\sqrt{2}$
2. $25\sqrt{2}$
3. $2\sqrt{5}$
4. $5\sqrt{10}$

32. An example of an irrational number is

1. 5.3
2. $\sqrt{3}$
3. 0
4. $-11/6$

33. For which value of $x$ is the expression $\frac{x + 1}{x - 3}$ undefined?

1. 0
2. -1
3. 3
4. -3

34. The solution set of $x^2 - 2x - 8 = 0$ is

1. {4, -2}
2. {-4, 2}
3. {-2, 8}
4. {6, 2}

35. What is the slope of the line whose equation is $5y = 2x + 10$?

1. 5/2
2. 2
3. 2/5
4. 5
36. a On the same set of coordinate axes, graph the following system of inequalities.

\[
\begin{align*}
y & \leq \frac{1}{2}x - 3 \\
y & > -2x + 4
\end{align*}
\]

b Based on the graphs drawn in part a, in which solution set(s) does the point whose coordinates are \((0,4)\) lie? [2]

(1) \(y \leq \frac{1}{2}x - 3\), only
(2) \(y > -2x + 4\), only
(3) both \(y \leq \frac{1}{2}x - 3\) and \(y > -2x + 4\)
(4) neither \(y \leq \frac{1}{2}x - 3\) nor \(y > -2x + 4\)

37. a Solve the following system of equations algebraically and check:

\[
\begin{align*}
y &= 2x - 3 \\
x - 3y &= 24
\end{align*}
\]

b If the system of equations in part a were shown graphically, in which quadrant would the solution lie? [1]

38. Find three consecutive odd integers such that three times the square of the first integer is twelve more than the product of the second and third integers. [Only an algebraic solution will be accepted.] [4, 6]

39. In the accompanying diagram, \(\triangle ABC\) is inscribed in circle \(O\), diameter \(AC\) is extended to \(D\), and the ratio of the measure of minor arc \(AB\) to the measure of minor arc \(BC\) is 3: 2.

a Find the measure of
(1) minor arc \(AB\) [3]
(2) arc \(ACB\) [1]

b Find the measure of
(1) \(\angle BAC\) [2]
(2) \(\angle OBA\) [2]
(3) \(\angle BCD\) [2]

40. On your answer paper, complete the truth table for the statement

\([q \lor (\sim \phi \land \psi)] \rightarrow (\phi \leftrightarrow \sim q)\) [10]

<table>
<thead>
<tr>
<th>(p)</th>
<th>(q)</th>
<th>(-p)</th>
<th>((-p \land q))</th>
<th>(q \lor (-p \land q))</th>
<th>(-q)</th>
<th>(p \lor -q)</th>
<th>([q \lor (-p \land q)] \rightarrow (p \leftrightarrow \sim q))</th>
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41. In the accompanying diagram, the width of the inner rectangle is represented by \( x \) and the length by \( 2x - 1 \). The width of the outer rectangle is represented by \( x + 3 \) and the length by \( x + 5 \).

\[
\begin{array}{c}
\text{x + 3} \\
\text{x}
\end{array}
\]

\[
\begin{array}{c}
\text{2x - 1} \\
\text{x + 5}
\end{array}
\]

\( x + 3 \)

\( x + 5 \)

a Express the area of
(1) the inner rectangle as a binomial in terms of \( x \) [2]

\( a \) (1)_____

(2) the outer rectangle as a trinomial in terms of \( x \) [2]

\( a \) (2)_____

(3) the shaded region as a trinomial in terms of \( x \) [2]

\( a \) (3)_____

b If the perimeter of the outer rectangle is 24, what is the value of \( x \)? [4]

\( b \)_____}

42. A math test was given to Ms. Jones' class. The table below shows the time the students took to complete the test.

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<thead>
<tr>
<th>Time (in minutes)</th>
<th>Frequency</th>
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<td>7</td>
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<tr>
<td>36</td>
<td>3</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

Using the data table, determine the

a total number of students who took the test [1] a_____ 

b mode [1] b_____ 

c median [2] c_____ 

d mean, to the nearest tenth [4] d_____ 

e probability that a student chosen at random completed the test in a time that was less than the mean [2] e_____