Running head: [INSERT TITLE HERE]

[INSERT TITLE HERE]

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Author Note

This paper was prepared for [INSERT COURSE NAME], [INSERT COURSE ASSIGNMENT] taught by [INSERT INSTRUCTOR’S NAME].
Directions: Please show all of your work for each problem. If applicable, you may find Microsoft Word’s equation editor helpful in creating mathematical expressions in Word. There is a tutorial on using this equation editor in Module 1 Lecture Notes. You also have the option of hand writing your work and scanning it.

1. Find the greatest common factor. 4, 6, 12.

2. Factor. $24x^3 + 30x^2$

3. Factor out the GCF with a negative coefficient. $-24m^2n^6 - 8mn^5 - 32n^4$

4. Factor completely by factoring out any common factors and then factoring by grouping. $6x^2 - 5xy + 6x - 5y$

5. The GCF of $15y + 20$ is 5. The GCF of $15y + 21$ is 3. Find the GCF of the product $(15y + 20)(15y + 21)$.

6. The area of a rectangle of length $x$ is given by $15x - x^2$. Find the width of the rectangle in terms of $x$.

7. Factor the trinomial completely. $x^2 + 8x - 9$

8. Factor the trinomial completely. $2x^2 + 16x + 32$

9. Complete the following statement. $6a^2 - 5a + 1 = (3a - 1)(\_\_\_\_\_)$

10. State whether the following is true or false. $x^2 - 7x - 30 = (x + 3)(x - 10)$

11. Factor completely. $x^2 + 11x + 28$

12. Factor completely. $15x^2 + 23x + 4$

13. Factor completely. $6z^3 - 27z^2 + 12z$

14. The number of hot dogs sold at the concession stand during each hour $h$ after opening at a soccer tournament is given by the polynomial $2h^2 - 19h + 24$. Write this polynomial in factored form.

15. Find a positive value for $k$ for which the polynomial can be factored. $x^2 - kx + 29$

16. Factor completely. $9x^2 + 4$

17. Determine whether the following trinomial is a perfect square. If it is, factor the binomial. $x^2 - 12x + 36$

18. Factor completely. $25x^2 + 40xy + 16y^2$
19. Factor. \( s^2(t - u) - 9t^2(t - u) \)

20. State which method should be applied as the first step for factoring the polynomial. \( 6x^3 + 9x \)

21. State which method should be applied as the first step for factoring the polynomial. \( 2a^2 + 9a + 10 \)

22. Solve the quadratic equation. \( 5x^2 + 17x = -6 \)

23. Solve the quadratic equation. \( 3x(2x - 15) = -84 \)

24. The sum of an integer and its square is 30. Find the integer.

25. If the sides of a square are decreased by 3 cm, the area is decreased by 81 cm\(^2\). What were the dimensions of the original square?

26. Write in simplest form. \( \frac{9x^8}{27x^{14}} \)

27. Write in simplest form. \( \frac{x^2 - 6x + 8}{x^2 - 16} \)

28. Write the expression in simplest form. \( \frac{4z - yz - 8y + 32}{yz - 4z - 2y + 8} \)

29. The area of the rectangle is represented by \( 5x^2 + 19x + 12 \). What is the length?

30. Multiply. \( \frac{9x^3}{2} \cdot \frac{8}{x^8} \)

31. Multiply. \( \frac{3x - 12}{x^2 - 5x} \cdot \frac{7x}{4 - x} \)

32. Divide. \( \frac{2x - 6}{21} \div \frac{5x - 15}{12} \)
33. Divide. \( \frac{x^2 - 4y^2}{6x^2 - 12xy} \div (x^2 + 2xy) \)

34. Perform the indicated operations. \( \frac{x^2 - 9x}{4x - 24} \cdot \frac{x^2 - 36}{4x^3 - 36x} \cdot \frac{8x}{x^2 + 5x - 6} \)

35. Find the area of the rectangle shown.

\[
\begin{array}{c}
\frac{4x - 4}{x - 7} \\
\frac{3x + 5}{x - 1}
\end{array}
\]

36. Subtract. Express your answer in simplest form. \( \frac{7x}{20} - \frac{x}{20} \)

37. Subtract. Express your answer in simplest form. \( \frac{3x}{x - 4} - \frac{12}{x - 4} \)

38. Add. Express your answer in simplest form. \( \frac{x^2}{x - 7} + \frac{3x - 70}{x - 7} \)

39. Add. Express your answer in simplest form. \( \frac{8}{s} + \frac{10}{s^2} \)

40. Add or subtract as indicated. \( \frac{1}{r + 6} - \frac{1}{r - 6} + \frac{2r}{r^2 - 36} \)

41. One number is 8 less than another. Let \( x \) represent the larger number and use a rational expression to represent the sum of the reciprocals of the two numbers.

42. Simplify. \( \frac{8}{20} \cdot \frac{4}{6} \)
43. Simplify. \[
\frac{10 - \frac{a}{b}}{30 - \frac{b}{b}}
\]

44. What values for \( x \), if any, must be excluded in the following algebraic fraction?
\[
\frac{x - 2}{7}
\]

45. What values for \( x \), if any, must be excluded in the following algebraic fraction?
\[
\frac{x + 2}{x^2 - 9x + 14}
\]

46. Solve for \( x \).
\[
\frac{x}{5} + 6 = 1
\]

47. Solve for \( x \).
\[
\frac{x}{x - 3} + 5 = \frac{3}{x - 3}
\]

48. Solve for \( x \).
\[
\frac{2}{7} = \frac{6}{x}
\]

49. One number is 3 times another. If the sum of their reciprocals is \( \frac{2}{9} \), find the two numbers.

50. A 5-foot pole casts a shadow of 4 feet. How tall is a tree with a shadow of 16 feet?