Problems 1~8, show work problems
Determine the domain and range of the function. Then graph and label at least four points on the graph grid.

1. \[ f(x) = \sqrt{x - 4} \]
2. \[ f(x) = \sqrt{x - 3} \]
3. \[ f(x) = -\sqrt{x + 4} \]

Solve the equation. Show all steps to get full credit and do not forget to check for the extraneous solutions.

4. \[ \sqrt{2x + 3} - \sqrt{x + 1} = 1 \]
5. \[ \left(3x - 2\right)^2 + \left(1 + x\right)^2 = -1 \]

Simplify the complex rational expression using either Method I or Method II.

6. \[ \frac{4}{x} + 7 \]
7. \[ \frac{7}{x + 3} - \frac{7}{x - 3} \]
8. \[ \frac{(x + 3)^{-1} + (x - 3)^{-1}}{(x^2 - 9)^{-1}} \]

Reduce the rational expression to lowest terms.

11. \[ \frac{m^2 - 9mn + 20n^2}{m^2 - 10mn + 25n^2} \]

Multiply the rational expression. Express the product as a rational expression in lowest terms.

12. \[ \frac{x^2 - 16x + 55}{x^2 - 21x + 108} \cdot \frac{x^2 - 18x + 72}{x^2 - 8x + 15} \]
13. \[ \frac{y^2 - 49}{y^2 - 64} \cdot \frac{y^2 + 7y - 8}{y^2 - 15y + 56} \]
14. \[ \frac{5m^2 + 10mn + 5n^2}{m^2 - n^2} \cdot \frac{n - m}{3m + 3n} \]

Add or subtract, as indicated, and simplify the result.

15. \[ \frac{m - 3}{m^2 - 2m - 8} + \frac{4m + 5}{m^2 + 8m + 12} \]
16. \[ \frac{x}{x^2 - 16} - \frac{4}{x^2 + 5x + 4} \]

Solve the equation. Do not forget to check for the extraneous solutions.

17. \[ \frac{6}{x + 4} - \frac{9}{x - 4} = \frac{3}{x^2 - 16} \]
18. \[ \frac{6}{5x} - \frac{1}{x + 1} = \frac{3}{2x^2 + 2x} \]
19. \[ -\sqrt{4x + 5} = -6 \]

Simplify using rational exponents.

20. \[ \sqrt[3]{27x^{1/2}y^3} \cdot \sqrt{4xy^{1/2}} \]

Simplify the expression. Assume all variables represent positive real numbers.

21. \[ \sqrt[7]{17a^{11}b^{-11}} \]
22. \[ \sqrt[3]{3x^{13}y^2 + 2\sqrt[3]{xy^2}} \]
23. \((\sqrt{7} + \sqrt{13z})(\sqrt{11} - \sqrt{13z})\)

Perform the indicated operation. Write the result in the form \(a + bi\).

24. \((5 - 9i) + (9 + 6i)\)

25. \((5 - 4i)(6 + 3i)\)

26. \(\frac{8 - 3i}{7 + 9i}\)

Find the domain of the given function.

27. \(f(x) = \sqrt{-8x + 9}\)

28. \(f(x) = \sqrt{\frac{x - 7}{x}}\)

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

29. \(\frac{\sqrt{6}}{\sqrt{7} + 5}\)

Simplify by factoring out the given factor.

30. \(x^{4/5} + 3x^{3/5}; \ x^{3/5}\)

31. \(2m^{9/4} - 5m^{-1/2}; \ m^{-1/2}\)

Distribute and simplify.

32. \(y^{5/9}(y^{3/9} - 8y^{2/9})\)