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Simplify the rational expression, if possible.

$$1. \frac{n^2 + 8n + 15}{n^2 - 25}$$

$$2. \frac{x^3 + 4x^2}{x^2 - 16}$$

$$3. \frac{x^2 - x - 12}{x^2 + x - 20}$$

Perform the indicated operations. Simplify the result.

$$4. \frac{x+2}{x+9} \cdot \left[\frac{x^2+9x}{x^2-4} \div \frac{3x^2+6x}{x^2+2x} \right]$$

$$5. \frac{x^2+8x-20}{5x^3+50x^2} \div \frac{x^2+9x}{x^2+7x-18}$$

$$6. \frac{5}{3(x+2)} + \frac{7}{3(x+2)}$$

$$7. \frac{4x}{x^2-9} + \frac{2}{x+3} - \frac{2}{x-3}$$

$$8. \frac{x^2+11x+30}{x^2-25} \div \frac{x+6}{x-6}$$

$$9. \frac{3x+4}{x^2-16} - \frac{2}{x-4}$$

$$10. \frac{x^2y^3}{3x^4} \cdot \frac{(xy)^2}{x^3y} \div \frac{x^2y^4}{6y^3}$$

$$11. \frac{x^2+4x}{x^2-6x+8} \cdot \frac{x^2-x-2}{3x^3+12x^2}$$

$$12. \frac{9}{x+3} + \frac{2}{x-3}$$

Simplify the complex fraction.

$$13. \frac{\frac{2}{x-6}}{\frac{3}{x}+5}$$

$$14. \frac{\frac{4}{x-3} + \frac{2}{3}}{\frac{5}{x-3}}$$

$$15. \frac{\frac{2}{x+2} - \frac{3}{x}}{\frac{3}{x+2} + \frac{2}{x}}$$

Solve the equation. Check for extraneous solutions.

$$16. \frac{6}{x-2} = \frac{5}{x-3}$$

$$17. \frac{4}{j-1} - \frac{1}{j-3} = 0$$

$$18. \frac{1}{a^2-9} = \frac{1}{a+3}$$

$$19. \frac{x-7}{x+9} = \frac{x+1}{x-4}$$

Algebra 2 Unit 5 Review

20. $\frac{k}{k+1} + \frac{1}{k-1} = \frac{4k-3}{(k+1)(k-1)}$

21. $\frac{2x}{x-2} = \frac{1}{x^2-4} + 1$

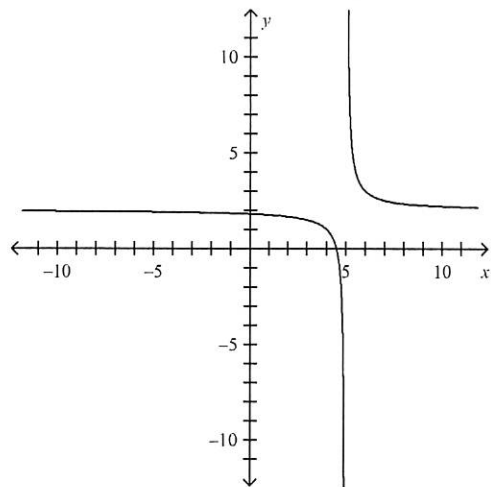
Graph each function. State the domain, range, intercepts, end behavior, and asymptotes.

22. $y = \frac{5}{x+2}$

23. $y = -\frac{3}{x+2}$

24. $f(x) = \frac{2}{x+4} - 1$

25. Write an equation for the graph shown

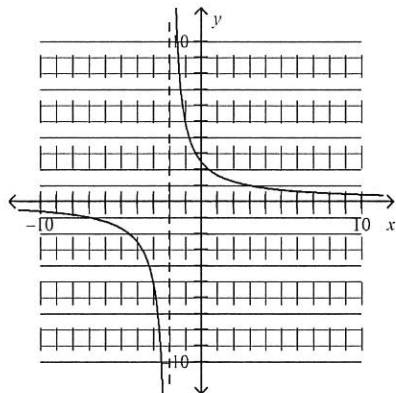


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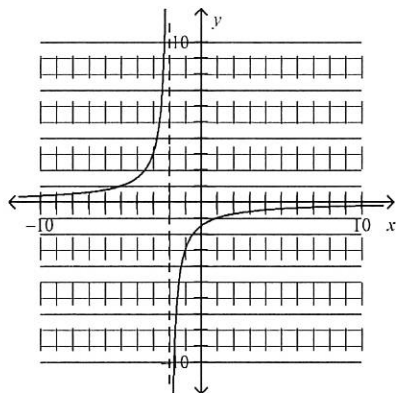
Answer Section

1. $\frac{n+3}{n-5}$
2. $\frac{x^2}{x-4}$
3. $\frac{x+3}{x+5}$
4. $\frac{x}{3(x-2)}$
5. $\frac{(x-2)^2}{5x^3}$
6. $\frac{4}{x+2}$
7. $\frac{4}{x+3}$
8. $\frac{x-6}{x-5}$
9. $\frac{1}{x+4}$
10. $\frac{2y^3}{x^5}$
11. $\frac{x+1}{3x(x-4)}$
12. $\frac{11x-21}{x^2-9}$
13. $\frac{2x}{5x^2-27x-18}$
14. $\frac{2(x+3)}{15}$
15. $-\frac{x+6}{5x+4}$
16. 8
17. $\frac{11}{3}$
18. 4
19. $\frac{19}{21}$
20. 2
21. -1, -3

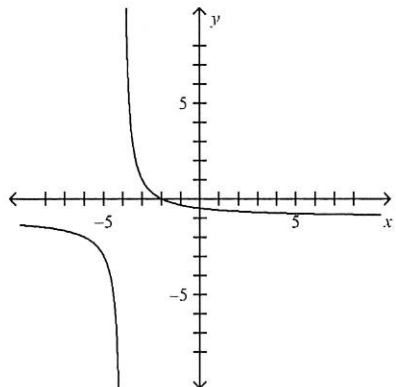
22.



23.



24.



25. $f(x) = \frac{1}{x-5} + 2$