Name _____ Class _____ Date _____

8-3 Practice

Form G

Rational Functions and Their Graphs

Find the domain, points of discontinuity, and x- and y-intercepts of each rational function. Determine whether the discontinuities are removable or nonremovable.

1. $y = \frac{(x - 4)(x + 3)}{x + 3}$

2. $y = \frac{(x - 3)(x + 1)}{x - 2}$

3. $y = \frac{2}{x + 1}$

4. $y = \frac{4x}{x^4 + 16}$

Find the vertical asymptotes and holes for the graph of each rational function.

5. $y = \frac{5 - x}{x^2 - 1}$

6. $y = \frac{x^2 - 2}{x + 2}$

7. $y = \frac{x}{x(x - 1)}$

8. $y = \frac{x + 3}{x^2 - 9}$

9. $y = \frac{x - 2}{(x + 2)(x - 2)}$

10. $y = \frac{x^2 - 4}{x^2 + 4}$

11. $y = \frac{x^2 - 25}{x - 4}$

12. $y = \frac{(x - 2)(2x + 3)}{(5x + 4)(x - 3)}$

Find the horizontal asymptote of the graph of each rational function.

13. $y = \frac{2}{x - 6}$

14. $y = \frac{x + 2}{x - 4}$

15. $y = \frac{2x^2 + 3}{x^2 - 6}$

16. $y = \frac{3x - 12}{x^2 - 2}$

Sketch the graph of each rational function.

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

18. $y = \frac{3}{(x - 2)(x + 2)}$

19. $y = \frac{x}{x^2 + 4}$

20. $y = \frac{x + 2}{x - 1}$

Name _____ Class _____ Date _____

8-3 Practice (continued) Form G

Rational Functions and Their Graphs

21. How many milliliters of 0.75% sugar solution must be added to 100 mL of 1.5% sugar solution to form a 1.25% sugar solution?

22. A soccer player has made 3 of his last 24 shots on goal, or 12.5%. How many more consecutive goals does he need to raise his shots-on-goal average to at least 20%?

23. **Error Analysis** A student listed the asymptotes of the function $y = \frac{x^2 + 5x + 6}{x(x^2 + 4x + 4)}$ as shown at the right. Explain the student's error(s). What are the correct asymptotes?

horizontal asymptote
none

vertical asymptote
$x = 0$

Sketch the graph of each rational function.

24. $y = \frac{x}{x(x - 6)}$

25. $y = \frac{2x}{x - 6}$

26. $y = \frac{x^2 - 1}{x^2 - 4}$

27. $y = \frac{2x^2 + 10x + 12}{x^2 - 9}$

28. You start a business word-processing papers for other students. You spend $3500 on a computer system and office furniture. You figure additional costs at $.02 per page.
    a. Write a rational function modeling the total average cost per page. Graph the function.
    b. What is the total average cost per page if you type 1000 pages? If you type 2000?
    c. How many pages must you type to bring your total average cost to less than $1.50 per page?
    d. What are the vertical and horizontal asymptotes of the graph of the function?