

Name: _____

Concepts and Vocabulary:

4. Is 5 a solution to $\frac{x+5}{x-5} = \frac{10}{x-5}$? Explain.

8. The domain of $f(x) = \frac{p(x)}{q(x)}$ includes all x -values such that $q(x) \neq$ _____ .

Rational Functions:

In exercises 21 - 29, identify the domain of f . State your answer using set notation in a complete sentence.

21. $f(x) = \frac{x+1}{x+2}$

27. $f(x) = \frac{x^2+1}{x^2-3x+2}$

25. $f(t) = \frac{2}{t^2-4}$

29. $f(x) = \frac{5}{x^3-4x}$

In exercises 37 - 41, graph the function on your calculator and look at it to determine the domain and range of the function. State the domain and range using set notation in a complete sentence.

$$37. f(x) = \frac{4}{x^2 + 1}$$

$$39. f(x) = \frac{3}{2x - 3}$$

$$41. f(x) = \frac{1}{x^2 - 1}$$

In exercises 45 and 47, evaluate the function as described.

$$45. \text{ If } f(x) = \frac{x + 1}{x - 1}, \text{ determine } f(-3).$$

$$47. \text{ If } f(x) = \frac{x^2 - 3x + 5}{x^2 + 1}, \text{ determine } f(-2).$$

Rational Equations:

In exercises 55 - 73, solve the given equation symbolically. State your conclusion using set notation. Check your solutions to exercises 67 and 73.

$$55. \frac{3}{x} = 5$$

$$59. \frac{x}{x + 1} = 2$$

$$63. \frac{3}{x+2} = x$$

$$71. \frac{4x}{x+2} = \frac{-8}{2x+4}$$

$$67. \frac{1}{x^2-1} = -1$$

$$73. \frac{2x}{x+2} = \frac{x-4}{x+2}$$

Check:

Check:

In exercises 75 and 79 solve the rational equation graphically using your calculator. You do not need to draw the graph but you do need to **state what you are putting in for y1 and y2** into your calculator. State the solution(s) using set notation in a complete sentence.

$$75. \frac{4+x}{2x} = -\frac{1}{2}$$

$$79. \frac{1}{x-1} = x-1$$

Application:

107. A jar contains x balls. Each ball has a unique number written on it and only one ball has the winning number. The likelihood, or probability P , of **not** drawing the winning ball is given by

$$P(x) = \frac{x - 1}{x},$$

where $x > 0$. For example, if $P = 0.99$, then there is a 99% chance of not drawing the winning ball.

- a. Evaluate $P(1)$ and $P(50)$ and interpret the results.
- b. Graph P on your calculator using a window with x -min= 0, x -max= 100, x -scl=10, y -min=0, y -max=1, and y -scl=0.1. Use this graph to answer the following two parts to this exercise.
- c. What happens to the probability of not winning as the number of balls increases? Does this result agree with your intuition? Explain.
- d. How many balls are in the jar if the probability of not winning is 0.975?