Finding the Domain of Simple Rational Functions[*]

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Abstract

Finding the domain of rational functions with no other complications such as roots/radicals.

For fractions, the denominator (the bottom) of the fraction cannot equal 0. Determine **domain** restrictions by setting the denominator equal to 0 and solving.

Example 1
Find the domain of $y = \frac{1}{x}$
$\{ x \mid x \neq 0 \}$

Exercise 1   (*Solution on p. 2.*)
Find the domain of $y = \frac{1}{x-5}$

Exercise 2   (*Solution on p. 2.*)
Find the domain of $y = \frac{4x+3}{x-7}$

Exercise 3   (*Solution on p. 2.*)
Find the domain of $y = \frac{7x}{5-2x}$

Exercise 4   (*Solution on p. 2.*)
Find the domain of $y = \frac{2}{(x-3)(x+7)}$

Exercise 5   (*Solution on p. 2.*)
Find the domain of $y = \frac{7x}{2x^2-7x+3}$

Exercise 6   (*Solution on p. 2.*)
$y = \frac{2x+1}{(x+5)^2}$

Exercise 7   (*Solution on p. 2.*)
Find the domain of $y = \frac{x+3}{x^2+25}$

Exercise 8   (*Solution on p. 2.*)
Find the domain of $y = \frac{x-7}{x^2+2}$

Exercise 9   (*Solution on p. 2.*)
Find the domain of $y = \frac{5}{|x-3|}$

Exercise 10   (*Solution on p. 2.*)
Find the domain of $y = \frac{4}{|x|-4}$

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[*]Version 1.7: May 1, 2006 6:47 pm -0500
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Solutions to Exercises in this Module

Solution to Exercise (p. 1)
$\{x \mid x \neq 5\}$ since $x - 5 \neq 0$, $x \neq 5$
Solution to Exercise (p. 1)
$\{x \mid x \neq 7\}$ since $x - 7 \neq 0$, $x \neq 7$
Solution to Exercise (p. 1)
$\left\{x \mid x \neq \frac{5}{2}\right\}$ since $5 - 2x \neq 0$, $x \neq \frac{5}{2}$
Solution to Exercise (p. 1)
$\{x \mid x \neq 3 \ \vee \ -7\}$ since $x \neq 3$ and $x \neq -7$
Solution to Exercise (p. 1)
$\left\{x \mid x \neq \frac{1}{2} \ \vee \ 3\right\}$ since $2x^2 - 7x + 3 \neq 0$, $(2x - 1)(x - 3) \neq 0$, $2x - 1 \neq 0$ and $x - 3 \neq 0$, $x \neq \frac{1}{2}$ and $x \neq 3$
Solution to Exercise (p. 1)
$\{x \mid x \neq -5\}$ since $(x + 5)^2 \neq 0$, $x + 5 \neq 0$, $x \neq -5$
Solution to Exercise (p. 1)
$\{x \mid x \in \mathbb{R}\}$ since $x^2 + 25 \neq 0$, $x^2 \neq -25$, $x \in \mathbb{R}$
Solution to Exercise (p. 1)
$\{x \mid x \in \mathbb{R}\}$ since $x^2 + 2 \neq 0$, $x^2 \neq -2$, $x \in \mathbb{R}$
Solution to Exercise (p. 1)
$\{x \mid x \neq 3\}$ since $|x - 3| \neq 0$, $x - 3 \neq 0$, $x \neq 3$
Solution to Exercise (p. 1)
$\{x \mid x \neq -4 \ \vee \ 4\}$ since $|x| - 4 \neq 0$, $|x| \neq 4$, $x \neq -4$ and $x \neq 4$