

Notes Domain of a Function

The **domain** of a function is all the x-values (inputs) of that function.

To find the domain of a function:

1. Begin by assuming that the domain is ALL REAL NUMBERS
2. Determine if there is any place where this function is not defined (gives you issues). These “issues” will be excluded from your domain. The two types of functions that have issues are:
 - a. Rational functions because division by zero is undefined.
 - b. EVEN root functions because we cannot take the even root of a negative number.

A. To find the domain of rational functions:

1. Set the denominator equal to zero and solve for x.
2. The domain will be all real numbers EXCEPT where the denominator equals zero.

Find the domain of the following functions. Write answers in interval notation.

EX1: $f(x) = \frac{x}{9-x^2}$	EX2: $f(x) = \frac{x+8}{8x^3-2x^2-3x}$
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B. To find the domain of EVEN root functions:

i. *If the radical is in the numerator:*

Set the expression under the radical greater than or equal to zero and solve for x.

ii. *If the radical is in the denominator:*

Set the expression under the radical greater than zero and solve for x. (can't be equal to zero because it is in the denominator).

Find the domain of the following functions. Write answers in interval notation.

EX3: $f(x) = \sqrt{x^2-3x-4}$	EX4: $f(x) = \frac{1}{\sqrt{3x+1}}$
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Sometimes you will have a function that is rational AND has a radical in the numerator. For these functions you need to:

1. Set the expression under the radical greater than or equal to zero and solve for x.
2. Set the denominator equal to zero and solve for x.
3. The domain will be the numbers allowed after step 1 EXCEPT where the denominator equals zero.

Find the domain of the following functions. Write answers in interval notation.

EX5: $f(x) = \frac{\sqrt{x+1}}{x^2 - 4x - 12}$

EX6: $f(x) = \frac{\sqrt{-9x+27}}{x-1}$

EX7: $f(x) = \frac{\sqrt{x^2 - 5x + 6}}{x^2 + 4}$

Find the domain of the following functions. Write answers in interval notation.

Ex8: $f(x) = 2x + 5$

Ex9: $f(x) = x^3 + 2x - 7$