Precalculus Unit 1: 1.2 – Extra Examples
Finding Domain from a Function Equation

Finding Domain:

For the functions we will be working with at this time, the domain will be all real numbers unless you have one of the following:

1. A value that creates a zero in the denominator.
2. A value that creates a negative number under an **even** root.

Some examples:

A. $f(x) = \frac{6}{5}x^2 - 4x + 2$ For this function, there are no fractions with variables in the denominator and there are no even roots. It has a domain of ***All Real Numbers***.

B. $g(z) = \frac{8z+2}{15}$ This function also has a domain of ***All Real Numbers*** because it doesn't have a fraction with a variable in the denominator and there are no even roots.

C. $f(x) = \frac{4+x}{8-x}$ With this function we run in to the problem of having a zero in the denominator. To find the domain in this case, take the denominator and set it equal to zero and then solve that equation.

$8 - x = 0$ so $x = 8$

The solution(s) to this equation are the values that CANNOT be included in the domain for this function, so the domain is ***All Real Numbers, $x \neq 8$.***

D. $h(x) = \frac{5x+3}{2x^2-3x-2}$ Here again, we have an issue with zero in the denominator. Start by setting the denominator equal to zero and solving that equation. Since this is a quadratic equation, it will require some factoring or the use of the quadratic formula.

$$2x^2 - 3x - 2 = 0 \quad \rightarrow \quad (2x+1)(x-2) = 0 \quad \rightarrow \quad x = \frac{-1}{2} \ \ or\ x = 2$$

The domain is then ***All Real Numbers, $x \neq \frac{-1}{2}, x \neq 2$.***

E. $g(x) = \sqrt{3 + x}$

The problem with the domain of this function is that we potentially will have a negative under the root. To find a domain when an even root is involved, take the expression that is under the root and make it greater than or equal to zero to avoid negatives.

$3 + x \geq 0 \quad \rightarrow \quad x \geq -3$

The solution to this inequality, $\boldsymbol{x \geq -3}$ is the domain of this function.

F. $f(x) = \sqrt[3]{x}$

The domain for this function is ***All Real Numbers*** because the index on the root, 3, is odd.

G. $h(x) = \sqrt{16 - x^2}$

This is an even indexed root, so take the expression under the root and write your inequality.

$16 - x^2 \geq 0 \quad \rightarrow \quad 16 = x^2 \quad \rightarrow \quad x = \pm 4 \quad \rightarrow \quad -4 \leq x \leq 4$

The solution to this inequality, $\boldsymbol{-4 \leq x \leq 4}$ is the domain of this function.