Algebra II

5-4
Domain and Zeros
of Rational Functions

Function- A rule or a map which assigns each value of the domain to exactly one value of the range.

Rational Function- a function of the form $f(x) = \frac{p(x)}{q(x)}$ (a function with x in the bottom)
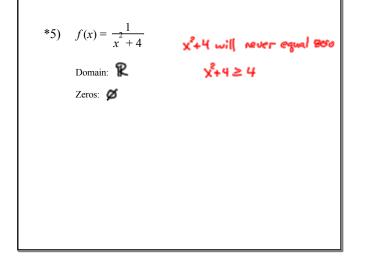
Domain- the set of all possible inputs, usually x

What must always be a concern when working with Rational Functions? Zero is not allowed in the denominator.

Zeros- any x that has an output of 0.

What has to be true about a fraction that is equal to zero?
the numerator must equal zero

Find the domain and the zeros for the following functions.

*1) $f(x) = \dfrac{x-2}{x+5}$

Domain: $\mathbb{R}$ except $\{-5\}$

Zeros: $\{2\}$ ← makes the bottom zero (which isn't allowed)

↳ makes the top zero

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*2) $f(x) = \dfrac{1}{x^2 - 5x - 6} = \dfrac{1}{(x+1)(x-6)}$

Domain: $\mathbb{R}$ except $\{-1, 6\}$

Zeros: $\varnothing$

there's no way for 1 to equal 0

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*3) $f(x) = x^2 - x - 12 = (x-4)(x+3)$

Domain: $\mathbb{R}$ (no bottom, no except)

Zeros: $\{4, -3\}$

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*4) $f(x) = \dfrac{x^2 - 2x - 15}{x - 5} = \dfrac{(x+3)(x-5)}{(x-5)}$

Domain: $\mathbb{R}$ except $\{5\}$

Zeros: $\{-3\}$

even though they cancel, 5 can't be in domain

*5) $f(x) = \dfrac{1}{x^2 + 4}$ x^2+4 will never equal zero

Domain: $\mathbb{R}$ $x^2+4 \geq 4$

Zeros: $\varnothing$

Assignment:
  Pg. 228
    Oral: 7-15 all,
    Written: 21-28 all