Rational Functions

Example Problems

April 25, 2020

Problem 1: Undefined Rationals

For which values of x is the expression undefined?

$$\frac{x^2 - 81}{x^2 + x - 20}$$

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$$=$$

$$x = -5, 4$$

Problem 2: Finding Asymptotes and Holes

Find all vertical or horizontal asymptotes and all holes.

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$$\frac{(x+6)(x-3)}{(x-3)(x-4)}$$

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Find all vertical or horizontal asymptotes and all holes.

$$\frac{(x+6)(x-3)}{(x-3)(x-4)}$$

$$=$$

vertical asymptote at $x = 4$

horizontal aysmptote at $y = 1$

hole at $x = 3$

Problem 3: Finding X-Intercepts

Find all x-intercepts of the following function.

$$\frac{4x^2 - 64}{x^2 + 2x - 15}$$

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$$\frac{4x^2 - 64}{x^2 + 2x - 15} =$$

$$\frac{4(x^2 - 16)}{(x + 5)(x - 3)}$$

Problem 3: Finding X-Intercepts

Find all x-intercepts of the following function.

$$\frac{4(x^2-16)}{(x+5)(x-3)}$$

$$=$$

$$\frac{4(x+4)(x-4)}{(x+5)(x-3)} = 0$$

Problem 3: Finding X-Intercepts

Find all x-intercepts of the following function.

$$\frac{4(x+4)(x-4)}{(x+5)(x-3)} = 0$$

$$=$$

$$4(x+4)(x-4) = 0 \times (x+5)(x-3)$$

Problem 3: Finding X-Intercepts

Find all x-intercepts of the following function.

$$4(x+4)(x-4) = 0$$

$$=$$

$$x \textit{ intercepts} = (4,0), (-4,0)$$

Problem 4: Finding Y-Intercepts

Find all y-intercepts of the following function.

$$\frac{x^2 + 4x + 4}{x^2 - 8x + 12}$$

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Find all y-intercepts of the following function

$$\frac{x^2+4x+4}{x^2-8x+12}$$

$$=$$

$$\frac{(x+2)(x+2)}{(x-2)(x-6)}$$

Problem 4: Finding Y-Intercepts

Find all y-intercepts of the following function.

$$\frac{(x+2)(x+2)}{(x-2)(x-6)}$$

$$=$$

$$\frac{((0+2)((0+2)}{((0-2)((0-6)}$$

Problem 4: Finding Y-Intercepts

Find all y-intercepts of the following function.

$$\frac{(2)(2)}{(-2)(-6)} = \frac{4}{12}$$

$$y\ intercept = (0, \frac{1}{3})$$

Congrats!

I hope you learned something and enjoyed this video!