

# Warm Up

1. Simplify:  $x(x+2) - 3x(x-1)$

$$x^2 + 2x - 3x^2 + 3x$$

$$\boxed{-2x^2 + 5x}$$

2. Analyze:

$$\lim_{x \rightarrow 2} \frac{x^2 - 7x + 10}{x^2 - 4}$$

*\*Factor first*

$$\lim_{x \rightarrow \textcircled{2}} \frac{\cancel{(x-2)}(x-5)}{(x+2)\cancel{(x-2)}} = \frac{x-5}{x+2} = \frac{2-5}{2+2} = \frac{-3}{4}$$

↑  
location

3. Analyze:

$$\lim_{x \rightarrow -1} \frac{x^2 + x - 2}{x^2 - 1}$$

$$\lim_{x \rightarrow \textcircled{-1}} \frac{(x+2)\cancel{(x-1)}}{(x+1)\cancel{(x-1)}} = \frac{x+2}{x+1} = \frac{-1+2}{-1+1} = \frac{1}{0}$$

↑

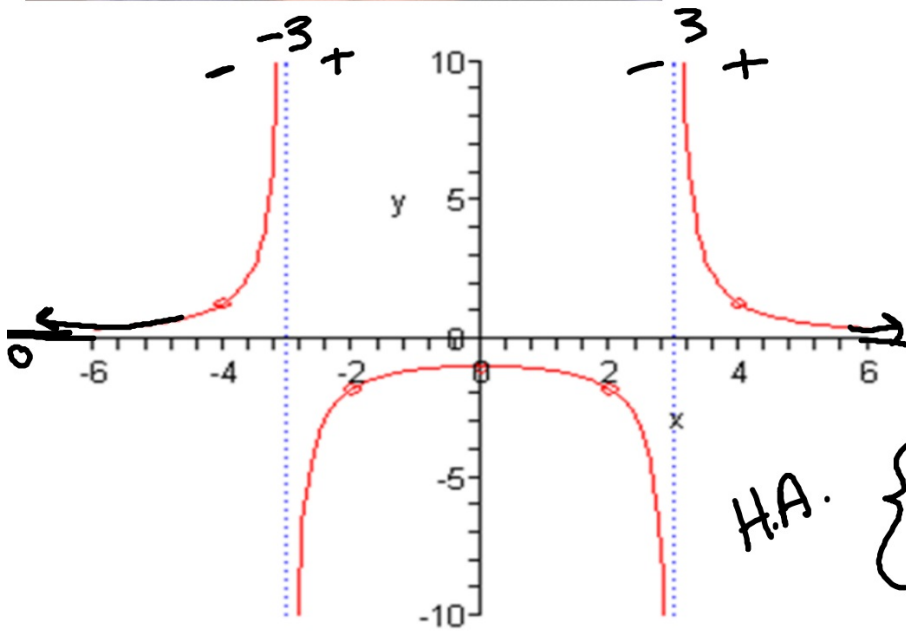
= Error

und.

Does not exist



# Practice your Limits!



$$\lim_{x \rightarrow -3^-} f(x) = +\infty$$

$$\lim_{x \rightarrow -3^+} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^+} f(x) = +\infty$$

H.A.  $\left\{ \begin{array}{l} \lim_{x \rightarrow -\infty} f(x) = 0 \\ \lim_{x \rightarrow \infty} f(x) = 0 \end{array} \right.$

## 3.6 Rational Equations & their solutions

I can solve rational equations and check for extraneous solutions

## Key Words

**Rational Equation: An equation with variables and fractions that can be combined using a common denominator.**

$$f(x) = \frac{5 \cdot 3}{5x} + \frac{2x \cdot x}{5x}$$

## Key Words

**Common Denominator: The same number/expression on the bottom of a fraction.**

**CD's let us combine fractions together**

$$\begin{array}{ccc} \frac{1}{2} & + & \frac{1}{3} \\ \curvearrowleft & & \curvearrowright \\ \frac{3}{6} & + & \frac{2}{6} \\ & & \frac{5}{6} \end{array}$$

## Key Words

**Solution Set Notation: A way to represent multiple "x" answers using braces {}.**

**Example: If your answers are  $x = 1$ ,  $x = 2$ , and  $x = -3$  would be written as  $\{-3, 1, 2\}$**

## Key Words

Extraneous Solution: an answer that does not work if plugged back into a rational equation.

It will give you, "error" in your calculator.

# Example Problem 1

1.  $x + \frac{3}{x} = 4$

$$1 + \frac{3}{1} = 4$$

$$3 + \frac{3}{3} = 4$$

$$1 + 3 = 4$$

$$4 = 4$$

$$4 = 4$$

✓

$$\frac{x^2}{x} + \frac{3}{x} = \frac{4x}{x}$$

Simplify

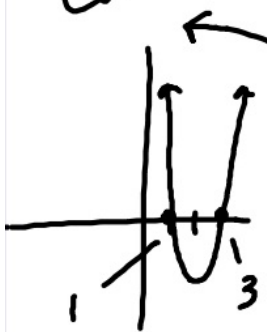
calculator

$$x^2 + 3 = 4x$$

rewrite the numerator

$$x^2 - 4x + 3 = 0$$

factor



$$(x-3)(x-1) = 0$$

↓  
3

↓  
1

$$\{1, 3\}$$

✓ ✓

$$\begin{array}{c} \text{3} \\ \text{(-3) } \times \text{ (-1)} \\ \text{-4} \end{array}$$



## Example Problem 2

2.  $\frac{-2x-3}{-2} + \frac{3}{(-2)+2} + \frac{6}{(-2)^2+2(-2)} = 0$  error  
error

$$\frac{(x+2) \cancel{x-3}}{(x+2) \cancel{x}} + \frac{3 \cancel{(x)}}{x+2 \cancel{(x)}} + \frac{6}{x(x+2)} = 0$$

$$(x+2)(x-3) + 3x + 6 = 0$$

$$x^2 - 3x + 2x - 6 + 3x + 6 = 0$$

$$x^2 + 2x = 0$$

$$x(x+2) = 0$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 0 & -2 \end{array}$$

$$\{\cancel{-2}, \cancel{0}\}$$

- ~~$\{-2, 0\}$~~
- ~~$\{-2\}$~~
- ~~$\{0\}$~~

**D. NO SOLUTION**

## Examples 3-5 Gallery Walk

- **Work with a partner**
- **Walk around the examples**
- **Copy down each step**
- **Look at how the answers are presented**

## Little Slips

- Check each answer
- Ask 3 before me
- Use your tools to help!

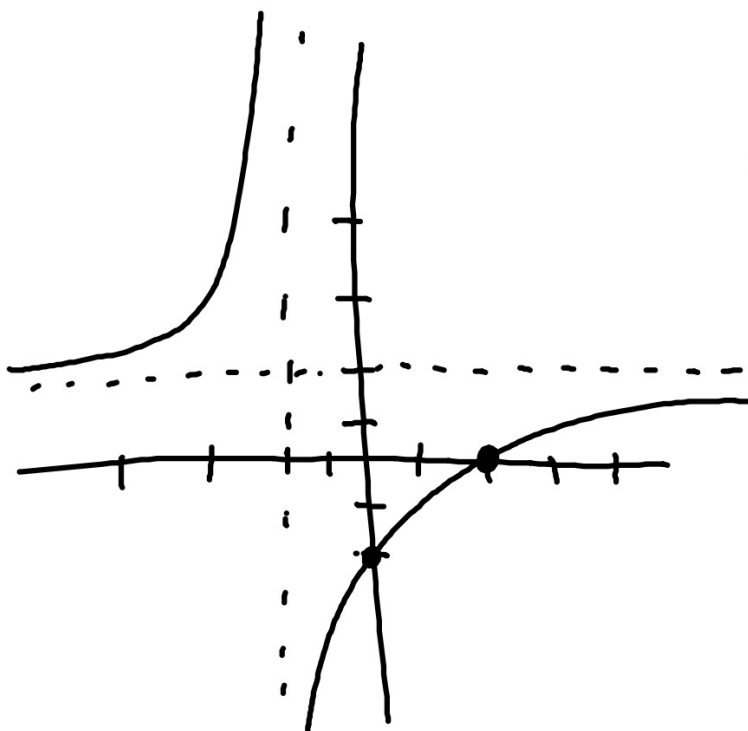
C  
B  
A  
A++



## **Rational Equation Error Analysis**

Look at the work, describe the steps and if there are any errors. If so, fix the errors and explain what was done incorrectly.

# Exit Ticket



□ x intercept?

□ y intercept?

□ HA?

□ VA?

□ What type of continuity?