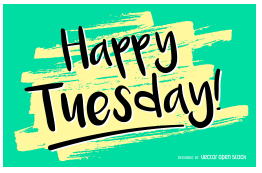


Pick up the warm up please

any HW questions?

WARM - UP
3.2.4

[Suppose to look Spooky? ok, not.

① Does $f(x) = \frac{3x-1}{x+8}$ have a vertical asymptote? If so what is its equation?

$x = -8$

Does $f(x) = \frac{3x-1}{x+8}$ have a horizontal asymptote? If so, what is its equation

[hint: to find horizontal asymptotes you can play the "Billion Dollar Game"]

$\frac{3x-1}{x+8} = \frac{3B}{B}$ $y = 3$

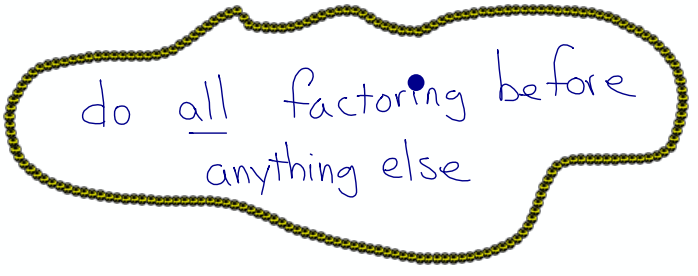
(2) Is $f(x) = \frac{5n-20}{n-4}$ always equal to 5? If so, why not?

No, it will be undefined when $n=4$

$$\frac{5(n-4)}{n-4} = 5$$

The Big Kahuna

Simplify $\frac{12x-18}{x-3} \div \frac{3x^2-9x-12}{6-2x}$



simple

$$\frac{12x-18}{x-3} \div \frac{3x^2-9x-12}{6-2x}$$

simple factoring then....

simple

$$\frac{12x-18}{x+3} \div \frac{3x^2-9x-12}{6-2x}$$

$$\frac{6(2x-3)}{x-3} \div \frac{3(x^2-3x-4)}{2(3-x)} \qquad \frac{3(x-4)(x+1)}{}$$

$$-\frac{4(2x-3)}{(x-4)(x+1)}$$

$$\frac{2\cancel{6}(2x-3)}{\cancel{x-3}} \cdot \frac{-2\cancel{(x-3)}}{\cancel{3}(x-4)(x+1)} \Rightarrow \frac{-4(2x-3)}{(x-4)(x+1)}$$

$$\frac{2x-18}{x+3} \div \frac{3x^2-9x-12}{6-2x}$$

$$\frac{2(2x-3)}{x-3} \div \frac{3(x^2-3x-4)}{2(3-x)}$$

$$\frac{6(2x-3)}{x-3} \cdot \frac{2(3-x)}{3(x-4)(x+1)}$$

(4) Solve the Absolute Value equation

$$\frac{|2x-3|}{9} = 2$$

$$|2x-3| = 18$$

$2x-3 = 18$ $\qquad$ $2x-3 = -18$

$+3 \quad +3$

$2x = 21$ $\qquad$ $2x = -15$

$x = \frac{21}{2}$ $\qquad$ $x = -\frac{15}{2}$

METHODS AND MEANINGS

MATH NOTES

Rewriting Rational Expressions

To simplify a rational expression, both the numerator and denominator must be written in factored form. Then look for factors that make a "Giant One"(a form of the number 1) and simplify. Study Examples 1 and 2 below.

Example 1: $\frac{x^2+5x+4}{x^2+x-12} = \frac{(x+4)(x+1)}{(x+4)(x-3)} = 1 \cdot \frac{x+1}{x-3} = \frac{x+1}{x-3}$ for $x \neq -4$ or 3

Example 2: $\frac{2x-7}{2x^2+3x-35} = \frac{(2x-7)(1)}{(2x-7)(x+5)} = 1 \cdot \frac{1}{x+5} = \frac{1}{x+5}$ for $x \neq -5$ or $\frac{7}{2}$

Just as you can multiply and divide fractions, you can multiply and divide rational expressions.

Example 3: Multiply $\frac{x^2+6x}{(x+6)^2} \cdot \frac{x^2+7x+6}{x^2-1}$ and symplify for $x \neq -6$ or 1.

After factoring, this expression becomes: $\frac{x(x+6)}{(x+6)(x+6)} \cdot \frac{(x+1)(x+6)}{(x+1)(x-1)}$

After multiplying, reorder the factors: $\frac{(x+6)}{(x+6)} \cdot \frac{(x+6)}{(x+6)} \cdot \frac{x}{(x-1)} \cdot \frac{(x+1)}{(x+1)}$

Since $\frac{(x+6)}{(x+6)} = 1$ and $\frac{(x+1)}{(x+1)} = 1$, Simplify: $1 \cdot 1 \frac{x}{(x-1)} \cdot 1 \Rightarrow \frac{x}{(x-1)}$

Example 4: Divide $\frac{x^2-4x-5}{x^2-4x+4} \div \frac{x^2-2x-15}{x^2+4x-12}$ and simplify for $x \neq 2, 5, -3,$ or -6.

First, change to a multiplication expression: $\frac{x^2-4x-5}{x^2-4x+4} \cdot \frac{x^2+4x-12}{x^2-2x-15}$

Then factor each expression: $\frac{(x-5)(x+1)}{(x-2)(x-2)} \cdot \frac{(x-2)(x+6)}{(x-5)(x+3)}$

After multiplying, reorder the factors: $\frac{(x-5)}{(x-5)} \cdot \frac{(x-2)}{(x-2)} \cdot \frac{(x+1)}{(x-2)} \cdot \frac{(x+6)}{(x+3)}$

Since $\frac{(x-5)}{(x-5)} = 1$ and $\frac{(x-2)}{(x-2)} = 1$, simplify to get: $\frac{(x+1)(x+6)}{(x-2)(x+3)} \Rightarrow \frac{x^2+7x+6}{x^2+x-6}$

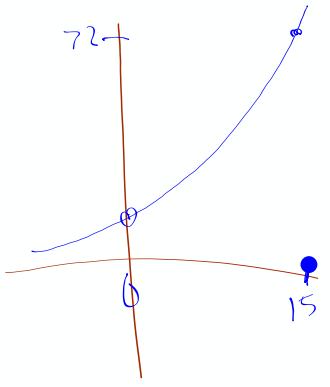
94 72 in b=3

$y = ab^x$

$y = a(3)^x$

$72 = a(3)^x$

$72 = a(3)^{15}$



94 bologna sandwich bacteria
currently 72 million
triples every 24 hours

15 days ago, there was _____ bacteria

FUNCTION $y = ab^x$

low as 100 ?

96c) $\frac{8}{k} = \frac{14}{k+3}$

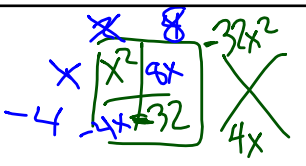
$8(k+3) = 14k$

90 a. $\frac{x-7}{9(2x-1)} \div \frac{(x+5)(x-7)}{6x(x+5)}$

$\frac{x-7}{9(2x-1)} \cdot \frac{6x}{x-7}$

9b. $\frac{6x^2-x-1}{3x^2+2x+8} \cdot \frac{x^2+4x-32}{2x^2+7x-4}$

9b. $\frac{6x^2-x-1}{3x^2+2x+8} \cdot \frac{x^2+4x-32}{2x^2+7x-4}$



$\frac{(2x-1)(3x+1)}{(3x^2+2x+8)} \cdot \frac{(x+8)(x-4)}{(x+4)(2x-1)}$

$x - 32x$
$2x - 16x$
$-4x + 8x$

91 a $\dfrac{(x+4)^2}{(x+4)(x-2)} =$

restrictions

91 b $\dfrac{8(x+2)^3(x-3)^3}{4(x+2)^2(x-3)^5}$

93b $3x - 2y = 30$
$2x + 3y = -19$

$72 = a(3)^{15}$

96 a. $\frac{m}{6} = \frac{m+1}{5}$ c. $\frac{3x-5}{2} = \frac{4x+1}{4}$

NOTE:

from this point on in this course, you may assume that all values of x that would make a denominator zero are excluded

Learning Target

Add & Subtract

Rational Expressions

a different process than + or -

1. Simplify individual fractions first.
2. Condense to a single fraction, getting a common denominator if needed.
3. Simplify further.

1. Simplify individual fractions first.
2. Condense to a single fraction, getting a common denominator if needed.
3. Simplify further.

helps to have a color pen of some type.

LEVEL 1

$\frac{2}{13} + \frac{5}{13} \rightarrow \frac{2+5}{13} \rightarrow \frac{7}{13}$

Keep the common denominator

$\frac{a-b}{8b} + \frac{6a-3b}{8b} \rightarrow \frac{a-b+6a-3b}{8b}$

$\frac{7a-4b}{8b}$

$$\frac{m-3n}{6m^3n} - \frac{m+3n}{6m^3n}$$

↓ condense

$$\frac{m-3n-(m+3n)}{6m^3n} \rightarrow \frac{m-3n-m-3n}{6m^3n} \rightarrow \frac{-6n}{6m^3n}$$

$$-\frac{1}{m^3}$$

$\frac{1}{3}\cdot\frac{(5)}{(5)} + \frac{2}{5}\cdot\frac{(3)}{(3)} \rightarrow \frac{5+6}{15} \rightarrow \boxed{\frac{11}{15}}$

$\frac{-5x^2+5x+24}{4(x-1)}$

$\frac{(x+4)(x)}{2x(x)} - \frac{(2)(x-1)}{(2)x^2} \rightarrow \frac{x(x+4) - 2(x-1)}{2x^2}$

$\frac{x^2+4x-2x+2}{2x^2} \rightarrow \boxed{\frac{x^2+2x+2}{2x^2}}$

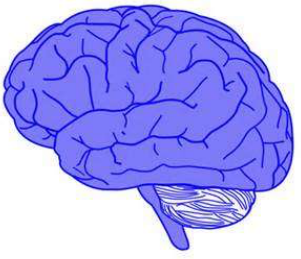
$\frac{2}{x} + \frac{3}{x^2} + \frac{1}{2x}$ (multiply by $2x$, $2x$, x) $\rightarrow \frac{4x + 6 + x}{2x^2}$

$\frac{5x + 6}{2x^2}$

$\frac{6}{1} + \frac{2}{x-4}$ (multiply by $(x-4)$, $(x-4)$) $\rightarrow \frac{6(x-4) + 2}{x-4}$

$\frac{6x - 24 + 2}{x-4}$

$\frac{6x - 22}{x-4}$



Brain Break!

DQS

$$\frac{x^2-25}{3x^2+15x} - \frac{3}{2x}$$

Simplify

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

$$\frac{x-5}{3x} - \frac{3}{2x}$$

Condense

$$\frac{(2)(x-5)}{(2)3x} - \frac{(3)3}{(3)2x}$$

$$\frac{2x-10-9}{6x}$$

$$\frac{2x-19}{6x}$$

Assignment

3.2.4 DAY 1 WORKSHEET

$$\frac{(n-4)^3}{(n-4)^2} \cdot \frac{(n-4)(n-4)(n-4)}{(n-4)(n-4)}$$