What's Going On?

Checking In	Homework Logs
Minds on	It's Elementary
Action!	Multiplying and Dividing Rational Expressions
Consolidation	Start, Stop, Continue

Learning Goal - I will be able to simplify rational functions and determine their restrictions.

Factoring Quiz

Sit at your own table.

Use pencil

When you're ready, let me know, you can start!

You will have 15 minutes once the announcements end.

You can start right now!

Checking In

after the quiz

F.F.M.

Get your grid books.

Simplify and state restrictions.

$$\frac{t^2 - 7t + 12}{t^3 - 6t^2 + 9t}$$

$$= \frac{(t-3)(t-4)}{t(t^2-6t+9)}$$

$$= \frac{(t-3)(t-4)}{t(t-3)^2} \; ; t \neq 0, 3$$

$$= \frac{t-4}{t(t-3)} \; ; t \neq 0, 3$$

Checking In

Factor, Restrict, Simplify

d) $\dfrac{4x^2-16y^2}{x^2+xy-6y^2}$

$= \dfrac{4(x^2-4y^2)}{x^2+3xy-2xy-6y^2}$

$= \dfrac{4(x+2y)(x-2y)}{x(x+3y)-2y(x+3y)}$

$= \dfrac{4(x+2y)(x-2y)}{(x+3y)(x-2y)}$ $\quad x \neq -3y$, $x \neq 2y$

$= \dfrac{4(x+2y)}{(x+3y)}$; $x \neq 2y, -3y$

Checking In

Factor, Restrict, Simplify

e) $P(n)=\dfrac{3n^3-3n^2}{8n^3-12n^2+4n}$

$$=\frac{3n^2(n-1)}{4n(2n^2-3n+1)}$$

$$=\frac{3n^2(n-1)}{4n(2n^2-2n-n+1)}$$

$$=\frac{3n^2(n-1)}{4n(2n(n-1)-1(n-1))}$$

$$=\frac{3n^2(n-1)}{4n(n-1)(2n-1)} \qquad n\neq 1,\ n\neq \tfrac{1}{2}$$

$$=\frac{3n}{4(2n-1)}\ ;\ n\neq \tfrac{1}{2},\ 1$$

Unit Test Next Wednesday

Minds on

It's Elementary

$2 \times \frac{1}{2}$

$= \frac{2}{1} \times \frac{1}{2}$

$= \frac{2}{2}$

$= 1$

$2 \div \frac{1}{2}$

$= 2 \times \frac{2}{1}$

$= 4$

$\frac{3}{4} \times \frac{1}{8}$

$= \frac{3}{32}$

$\frac{3}{4} \div \frac{1}{8}$

$= \frac{3}{4} \times \frac{8}{1}$

$= \frac{24}{4}$

$= 6$

Minds on

It's Elementary

$\frac{5}{6} \times \frac{2}{3} \div \frac{1}{5}$

$= \frac{5}{6} \times \frac{2}{3} \times \frac{5}{1}$

$= \frac{50}{18}$

$= \frac{25}{9}$

$5 \times \frac{3}{5} \div \frac{1}{3}$

$= \frac{5}{1} \times \frac{3}{5} \times \frac{3}{1}$

$= \frac{(5)(3)(3)}{(1)(5)(1)}$

$= 9$

$\frac{3}{8} \div \frac{1}{4} \times \frac{1}{2}$

$\frac{3}{8} \times \frac{4}{1} \times \frac{1}{2}$

$\frac{(3)(4)(1)}{2(4)(1)(2)}$

$= \frac{3}{4}$

$\frac{2}{3} \div \frac{5}{6} \div \frac{1}{4}$

$\frac{2}{3} \times \frac{6}{5} \times \frac{4}{1}$

$= \frac{48}{15}$

$= \frac{16}{5}$

Action!

Multiplying and Dividing Rational Expressions

Example 1: Simplify and state the restrictions: $\frac{6x^2}{5xy} \times \frac{15xy^3}{8xy^4}$

$$\frac{6x^2}{5xy} \times \frac{15xy^3}{8xy^4}$$

$$= \frac{90x^3y^3}{40x^2y^5}$$

$$= \frac{9x}{4y^2}$$

$$\frac{14x}{6y^2}$$

$$= \frac{9x}{4y^2}$$

Action!

Multiplying and Dividing Rational Expressions

To multiply rational expressions:

1. Factor the numerators and denominators, if possible
2. Divide out any factors that are common to the numerator and denominator
3. Multiply the numerators, multiply the denominators, and then write the result as a single rational expression

To divide rational expressions:

1. Multiply by the reciprocal of the divisor
2. Follow the steps for multiplication (Flip and multiply!)

To determine the restrictions:

1. Solve for the zeros of all the denominators in the factored expressions
2. If division, you must use solve for the zeros of the numerator AND denominator of the divisor

Action!

Multiplying and Dividing Rational Expressions

Example 2: Simplify and state the restrictions: $\frac{x^2-4}{(x+6)^2} \times \frac{x^2+9x+18}{2(2-x)}$

$$\frac{x^2-4}{(x+6)^2} \times \frac{x^2+9x+18}{2(2-x)}$$

$-2(x-2)$

$$= \frac{(x+2)(x-2)}{(x+6)^2} \times \frac{(x+3)(x+6)}{-2(x-2)}$$

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

$$= \frac{(x+2)(x+3)}{-2(x+6)} \; ; \; x \neq 2, -6$$

Action!

Multiplying and Dividing Rational Expressions

Example 3: Simplify and state the restrictions: $\frac{21p-3p^2}{16p+4p^2} \div \frac{14-9p+p^2}{12+7p+p^2}$

$\frac{a}{b} \div \frac{c}{d}$ b, c and d $\neq 0$

$= \frac{-3p^2+21p}{4p^2+16p} \times \frac{p^2+7p+12}{p^2-9p+14}$

$= \frac{-3p(p-7)}{4p(p+4)} \times \frac{(p+3)(p+4)}{(p-7)(p-2)}$

$\frac{-3p(p-7)(p+3)(p+4)}{4p(p+4)(p-7)(p-2)}$

$= \frac{-3(p+3)}{4(p-2)}$; $p \neq 0, 2, -4, 7$ or -3!!!!!

a vertical asymptote

Consolidation

Homework!

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