Your Name

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Notes

Lesson 7.3

Dividing Rational Polynomials

Day 2

Warm Up - complete on Notes and make sure to correct when we go over it

1. $\frac{4+15}{3+4} = \frac{19}{7} = 2.714$

Incorrect

2. $\frac{3x+15}{x+5} = \frac{3\cdot(x+5)}{1\cdot(x+5)}$

$\frac{3}{1}\cdot\frac{x+5}{x+5}$

3

9

45x

5x

You can't cancel terms that are added

You CANNOT cancel things that are not multiplied

Incorrect

$$\frac{x^2-4}{5}\cdot\frac{x+2}{x-2}$$

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

$$\frac{(x+2)(x+2)}{5} = \frac{(x+2)^2}{5}$$

not equal

$$\frac{x^2-4}{5}\cdot\frac{x+2}{x-2}$$

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

Dividing Fractions: How do you go about this?

$$\frac{14}{7} \div \frac{28}{4}$$ Flip

Skip Flip + Multiply
Keep Change Change

$$\frac{14}{7}\cdot\frac{4}{28} = \frac{2}{7}$$

$$\frac{7\cdot 2}{7}\cdot\frac{2\cdot 2}{2\cdot 2\cdot 7}$$

$$\frac{7\cdot 2\cdot 2\cdot 2}{7\cdot 2\cdot 2\cdot 7}$$

$$\frac{2}{7}$$

$$\frac{3x+12}{3}$$

$$\frac{3x}{3}+\frac{12}{3}$$

$$\frac{3x+12}{x+3}$$

$$\frac{3x}{x+3}+\frac{12}{x+3}$$

Dividing Polynomials by monomials

Divide each term by the monomial factor (no addition/subtraction in denominator)

$$\frac{2a^3b^3 + 8a^2b^2 - 10ab + 12}{2a^2b^2}$$

$$\frac{2a^3b^3}{2a^2b^2} + \frac{8a^2b^2}{2a^2b^2} - \frac{10ab}{2a^2b^2} + \frac{12}{2a^2b^2}$$

$$ab + 4 - \frac{5}{ab} + \frac{6}{a^2b^2}$$

Dividing Polynomials by monomials

Divide each term by the monomial factor (no addition/subtraction in denominator)

$$(x^3 + 2x^2 - x) \div x$$

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

$$x^2 + 2x - 1$$

$$(2x^3 + 12x - 8x) \div 2x$$

$$\frac{2x^3}{2x} + \frac{12x}{2x} - \frac{8x}{2x}$$

$$x^2 + 6 - 4$$

$$x^2 + 2$$

$$\frac{6a^2b^2 - 8ab + 12}{2a^2}$$

$$\frac{6a^2b^2}{2a^2} - \frac{8ab}{2a^2} + \frac{12}{2a^2}$$

$$3b^2 - 4a^{-1}b + 6a^{-2}$$

leave as negative exponents

$$\frac{2a^3b^3 + 8a^2b^2 - 10ab + 12}{2a^2b^2}$$

Dividing Rational Expressions

1. Rewrite with reciprocal of divided expression
2. Factor Completley (steps to factor happen elsewhere on scratch paper or on side)
3. Cancel common factors that are being divided whether diagonally or vertically to 1's.
4. Multiply straight across (numerators with numerators and denominators with denominators)

leftovers for final answer

make it a fraction

$\frac{6ab}{a^2b^2} \div \frac{a^2}{b^2}$ $\frac{x+2}{x-4} \div \frac{3x+6}{1}$ $\frac{2n-4}{n+2} \div \frac{2n+4}{n-4}$

done

$\frac{2x^2-10x+12}{x^2+3x} \div \frac{3-x}{4x+12}$ factor out a -1

$\frac{p^2-2pq+q^2}{p-q} \div \frac{p^2-q^2}{q-p}$

10. $\frac{49x+21}{6x} \div \frac{42x+18}{6}$

① $\frac{49x+21}{6x} \cdot \frac{6}{42x+18}$

② $\frac{7(7x+3)}{6x} \cdot \frac{6}{6(7x+3)}$

④ $\frac{7}{6x}$

11. $\frac{10x^2+42x+36}{6x^2-2x-60} \div \frac{40x+48}{3x^2-13x+10}$

① $\frac{10x^2+42x+36}{6x^2-2x-60} \cdot \frac{3x^2-13x+10}{40x+48}$

② $\frac{2(5x+6)(x+3)}{2(x+3)(3x-10)} \cdot \frac{(3x-10)(x-1)}{8(5x+6)}$

④ $\frac{x-1}{8}$

factoring work

$5x^2+21x+18$ (ac: 90; 6, 15; 21; b)

$5x^2+6x+15x+18$

$x(5x+6)+3(5x+6)$

$(5x+6)(x+3)$

$3x^2-x-30$ (ac: -90; 9, -10; -1; b)

$3x^2+9x-10x-30$

$3x(x+3)-10(x+3)$

$(x+3)(3x-10)$

$3x^2-13x+10$ (ac: 30; -10, -3; -13; b)

$3x^2-10x-3x+10$

$x(3x-10)-1(3x-10)$

$(3x-10)(x-1)$

12. $\frac{10x^2-28x+16}{2x-4} \div \frac{25x^2-25x+4}{5x^2-41x+8}$

① $\frac{10x^2-28x+16}{2x-4} \cdot \frac{5x^2-41x+8}{25x^2-25x+4}$

② $\frac{2(x-2)(5x-4)}{2(x-2)} \cdot \frac{(x-8)(5x-1)}{(5x-1)(5x-4)}$

④ $x-8$

Side Factoring Work

$2(5x^2-14x+8)$ (ac: 40; -10, -4; -14; b)

$2(5x^2-10x-4x+8)$

$2[5x(x-2)-4(x-2)]$

$2(x-2)(5x-4)$

$5x^2-41x+8$ (ac: 40; -40, -1; -41; b)

$5x^2-40x-1x+8$

$5x(x-8)-1(x-8)$

$(x-8)(5x-1)$

$25x^2-25x+4$ (ac: 100; -5, -20; -25; b)

$25x^2-5x-20x+4$

$5x(5x-1)-4(5x-1)$

$(5x-1)(5x-4)$

13. $\dfrac{6x+27}{18x^2+36x} \div \dfrac{16x+72}{2x+4}$

① $\dfrac{6x+27}{18x^2+36x} \cdot \dfrac{2x+4}{16x+72}$

② $\dfrac{3(2x+9)}{18x(x+2)} \cdot \dfrac{2(x+2)}{8(2x+9)}$

$\dfrac{1}{24x}$

14. $\dfrac{3x^2-25x-18}{27x+18} \div \dfrac{5x-3}{5x^2-33x+18}$

① $\dfrac{3x^2-25x-18}{27x+18} \cdot \dfrac{5x^2-33x+18}{5x-3}$

② $\dfrac{(3x+2)(x-9)}{9(3x+2)} \cdot \dfrac{(x-6)(5x-3)}{(5x-3)}$

③ $\dfrac{(x-9)(x-6)}{9}$

factor work

$5x^2-33x+18$ ac = 90, $-30 \cdot -3$, $-30-3=-33$, b

$5x^2-30x-3x+18$

$5x(x-6)-3(x-6)$

$(x-6)(5x-3)$

Your Turn!

$$\frac{3a^2 + 13a + 12}{a^2 + 3a - 10} \div \frac{4a^2 - 36}{a^2 - 25}$$

$$\frac{25 - n^2}{n^2 - 4n - 5}$$

9. $\frac{x-1}{2}$

10. $\frac{7}{6x}$

11. $\frac{x-1}{8}$

12. $x-8$

13. $\frac{1}{24x}$

HWK 5

$$\frac{2x^2+7x-30}{x^2+3x-4} \div \frac{2x^2-19x+35}{3x^3-6x^2-72x} \cdot \frac{-2x^2+19x-35}{108x-3x^3}$$

Flip

Don't flip fractions that are multiplied

① $\frac{2x^2+7x-30}{1x^2+3x-4} \cdot \frac{3x^3-6x^2-72x}{2x^2-19x+35} \cdot \frac{-2x^2+19x-35}{108x^1-3x^3}$

② $\frac{(x+6)(2x-5)}{(x+4)(x-1)} \cdot \frac{3x(x-6)(x+4)}{(2x^2-19x+35)} \cdot \frac{-1(2x^2-19x+35)}{3x(x+6)(x-6)}$

$\frac{(2x-5)(x-6)}{(x-1)(x-6)}$

Factor work:

$2x^2+7x-30$: -60, 12×-5, $2x^2+12x-5x-30$, $2x(x+6)-5(x+6)$, $(x+6)(2x-5)$

$2x^2-19x+35$: 70, -14×-5, $2x^2-14x-5x+35$, $2x(x-7)-5(x-7)$, $(x-7)(2x-5)$

HWK 1

$$\frac{10x-4x^2}{x^2+1x-12} \cdot \frac{x^2-1x-12}{x^2-5x-6} \div \frac{2x^2-1x-15}{6x^3-18x^2}$$

$$\frac{10x-4x^2}{x^2+1x-12} \cdot \frac{x^2-1x-12}{x^2-5x-6} \cdot \frac{6x^3-18x^2}{2x^2-x-15}$$

$\frac{-2x(2x-5)}{(x+4)(x-3)} \cdot \frac{(x-4)(x+3)}{(x-6)(x+1)} \cdot \frac{6x^2(x-3)}{(x-3)(2x+5)}$

$\frac{-12x^3(2x-5)(x-4)(x+3)}{(x+4)(x-6)(x+1)(x-3)(2x+5)}$

$10x-4x^2$

$2x(5-2x)$

$-2x(-5+2x)$

$-2x(2x-5)$

$5+2x$ same

$2x+5$

$5-2x = -1(2x-5)$ not same

$2x-5$

$2x^2-x-15$: -30, $2x^2-6x+5x-15$, $2x(x-3)+5(x-3)$, $(x-3)(2x+5)$

HWK 2

$$\frac{15x-5x^2}{x^2+8x+12} \div \frac{x^2-5x-14}{4x^3+24x^2} \cdot \frac{x^2-3x-28}{10x^3-90x}$$

$$\frac{15x-5x^2}{x^2+8x+12} \cdot \frac{4x^3+24x^2}{x^2-5x-14} \cdot \frac{x^2-3x-28}{10x^3-90x}$$

$$\frac{-5x(x-3)}{(x+2)(x+6)} \cdot \frac{4x^2(x+6)}{(x-7)(x+2)} \cdot \frac{(x-7)(x+4)}{10x(x-3)(x+3)}$$

$$\frac{-5x^1 \cdot 4x^2 \cdot (x+4)}{10x(x+2)(x+2)(x+3)} = \frac{-2x^2(x+4)}{(x+2)(x+2)(x+3)}$$

HWK 3

$$\frac{8x-12x^2}{x^2-1x-20} \div \frac{5x^2-25x}{x^2+9x+20} \cdot \frac{x^2-12x+35}{90x^3-40x}$$

$$= \frac{-2 \cdot (x-7) \cdot (x+5)}{25 \cdot x \cdot (x-5) \cdot (3 \cdot x+2)}$$

HWK 4

$$\frac{x^2+12x+36}{2x^2+9x+7}\cdot\frac{6x^2-21x}{x^2+1x-30}\div\frac{35x^3-10x^4}{2x^3-50x}$$

$$\frac{-6\cdot(x+5)\cdot(x+6)}{5\cdot x\cdot(2\cdot x^2+9\cdot x+7)}$$ or $$\frac{-6(x+5)(x+6)}{5x(2x+7)(x+1)}$$