Warm Up

1) Multiply and simplify the expressions.

a) $\frac{3x^2y^3z^4}{9xy^{-4}z^5} \cdot \frac{4xz^3}{yz^2}$

$\frac{12x^3y^3z^7}{9xy^{-3}z^7}$

$\frac{4x^2y^6}{3}$

b) $\frac{x^2-25}{x-5} \cdot \frac{x^2-3x-18}{x+5}$

$\frac{(x+5)(x-5)}{x-5} \cdot \frac{(x-6)(x+3)}{x+5}$

$(x-6)(x+3)$

2) Divide

$\frac{x^2-13x+40}{x^2-2x-15} \div \frac{(x^2-5x-24)}{1}$

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

$\frac{1}{(x+3)(x+3)}$ or $\frac{1}{(x+3)^2}$

DLT

*Check add, subtract, multiply, and divide ws

8.6 Solving Rational Functions

Solve for x and then check for extraneous solutions.

$$\frac{5}{x} = \frac{6}{12}$$

$6x = 60$

$x = 10$ ✓

$\frac{5}{10} = \frac{6}{12}$

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

8.6 Solving Rational Functions

Cross Multiply

$$\frac{3}{x+1} = \frac{9}{4x+5}$$

$3(4x+5) = 9(x+1)$

$12x+15 = 9x+9$

$3x = -6$

$x = -2$

Check:

$\frac{3}{-2+1} = \frac{9}{4(-2)+5}$ ✓

$\frac{3}{-1} = \frac{9}{-3}$

$-3 = -3$ ✓

TOYO

8.6 Solving Rational Functions

Solve the equation by cross multiplying. Check your solution (s).

1) $\frac{1}{2x+5} = \frac{x}{11x+8}$

$11x+8 = 2x^2+5x$

$0 = 2x^2-6x-8$

$0 = 2(x^2-3x-4)$

$0 = (x-4)(x+1)$

$x-4=0$ $\quad x+1=0$

$x=4$ $\quad x=-1$

$\frac{1}{8+5} = \frac{4}{44+8}$ $\quad \frac{1}{-2+5} = \frac{-1}{-11+8}$

$\frac{1}{13} = \frac{4}{52}$ $\quad \frac{1}{3} = \frac{-1}{-3}$

$\frac{1}{13} = \frac{1}{13}$ ✓ $\quad \frac{1}{3} = \frac{1}{3}$ ✓

8.6 Solving Rational Functions

What is Least Common Dominator (LCD)?

a) $\frac{5}{x} + \frac{7}{4}$

$4 \cdot \frac{5}{x} + \frac{7}{4} \cdot x$

$4 \cdot \frac{5}{x} \quad \frac{7}{4} \cdot x$

$4x$

$\frac{20+7x}{4x} = \frac{7x+20}{4x}$

b) $\frac{x-5}{x^2-9} + \frac{x+12}{x+3}$

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

$(x-3)$

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

c) $\frac{5a^2}{4b^3c} + \frac{3c}{6a^2b}$

TOYO

8.6 Solving Rational Functions

What is Least Common Dominator (LCD)?

a) $\frac{6}{x^2} + \frac{7}{5}$ $5x^2$

b) $\frac{x-1}{x^2-16} + \frac{x+2}{x+4}$ $(x+4)(x-4)$

$(x+4)(x-4)$

c) $\frac{2a}{ab^3c} + \frac{3bc}{6a^2b^2}$

8.6 Solving Rational Functions

Solve and check for extraneous solutions.

Example: $\left(\frac{1}{1} - \frac{8}{x-5} = \frac{3}{x}\right)$

1. $x(x-5)$

$x(x-5) - 8x = 3(x-5)$

$x^2 - 5x - 8x = 3x - 15$

$x^2 - 13x = 3x - 15$

$x^2 - 16x + 15 = 0$

$(x-15)(x-1) = 0$

$x = 15 \quad x = 1$

$1 - \frac{8}{10} = \frac{3}{15}$

$\frac{10}{10} - \frac{8}{10} = \frac{3}{15}$

$\frac{2}{10} = \frac{3}{15}$

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

Ex 2: $\left(\frac{6}{x-3} = \frac{8x^2}{x^2-9} - \frac{4x}{x+3}\right)$

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

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

$6(x+3) = 8x^2 - 4x(x-3)$

$6x + 18 = 8x^2 - 4x^2 + 12x$

$0 = 4x^2 + 6x - 18$

$0 = 2(2x^2 + 3x - 9)$

$0 = (2x^2 + 6x) - 3x - 9)$

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

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

$2x - 3 = 0 \qquad x + 3 = 0$

$x = \frac{3}{2} \qquad x = -3$

$6 \times -18 = -108$, $-3 + 3 = 0$

8.6 Solving Rational Functions

Solve the equation by using the LCD. Check for extraneous solutions.

5. $\frac{7}{2} + \frac{3}{x} = 3$

6. $\frac{2}{x} + \frac{4}{3} = 2$

7. $\frac{3}{7} + \frac{8}{x} = 1$

8. $\frac{3}{2} + \frac{4}{x-1} = \frac{x+1}{x-1}$

9. $\frac{3x}{x+1} - \frac{5}{2x} = \frac{3}{2x}$

10. $\frac{5x}{x-2} = 7$

5) $2x\left(\frac{7}{2} + \frac{3}{x} = \frac{3}{1}\right)$

$7x + 3(2) = 3(2x)$

$7x + 6 = 6x$

$6 = -1x$

$x = -6$

$2x(x+1)\left(\frac{3x}{x+1} - \frac{5}{2x} = \frac{3}{2x}\right)$

$6x^2 - 5(x+1) = 3(x+1)$

$6x^2 - 5x - 5 = 3x + 3$

$6x^2 - 8x - 8 = 0$

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

-12, -6, 2, -4

$(3x^2 - 6x) + (2x - 4) = 0$

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

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

$x = 2 \quad x = -\frac{2}{3}$

Solving Fix #1-6

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

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

$$-1+3=2$$

$$2=2$$

(2) $(x-2)(x+1)$

$$\left(\frac{4}{x-2}-\frac{3}{x+1}=\frac{8}{(x-2)(x+1)}\right)$$

$$4(x+1)-3(x-2)=8$$

$$4x+4-3x+6=8$$

$$x=-2$$

8.6 Solving Rational Functions

Solve the equation by using the LCD. Check for extraneous solutions.

5. $\frac{7}{2} + \frac{3}{x} = 3$

6. $\frac{2}{x} + \frac{4}{3} = 2$

7. $\frac{3}{7} + \frac{8}{x} = 1$

8. $\frac{3}{2} + \frac{4}{x-1} = \frac{x+1}{x-1}$

9. $\frac{3x}{x+1} - \frac{5}{2x} = \frac{3}{2x}$

10. $\frac{5x}{x-2} = 7$

HW: Page 593#9-12, 15-25 odd, 33, 34

*WS-odds

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https://teacher.desmos.com/polygraph-rationals

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