

Day 1 **Unit 2B:** Learning Target 7

I can solve a rational equation.

$$\frac{5 \cdot 6}{2 \cdot 6} + \frac{3x \cdot 2}{6 \cdot 2} = \frac{x}{12}$$

$$\frac{30}{12} + \frac{6x}{12} = \frac{x}{12}$$

$$12 \left[ \frac{30+6x}{12} \right] = \left[ \frac{x}{12} \right] 12$$

$$30 + 6x = x$$

$$30 = -5x$$

$$\boxed{-6 = x}$$

$$\frac{2x+4}{5x} = \frac{2 \cdot 5}{x \cdot 5}$$

$$5x \left[ \frac{2x+4}{5x} \right] = \left[ \frac{10}{5x} \right] 5x$$

$$2x+4 = 10$$

$$2x = 6$$

$$\boxed{x = 3}$$

- 1.) Factor denominators completely.
- 2.) Find the common denominator.
- 3.) Clear the fractions. Multiply each term by the common denominator. (You should no longer have fractions after this step!)
- 4.) Solve for the variable.
- 5.) Check for **extraneous** solutions.

1.)

$$\frac{2x^2 + x - 37}{x^2 - 2x - 15} = \frac{3}{1}$$

$$\frac{2x^2 + x - 37}{(x-5)(x+3)} = \frac{3(x+3)(x-5)}{1(x+3)(x-5)}$$

$$2x^2 + x - 37 = 3(x+3)(x-5)$$

$$2x^2 + x - 37 = 3(x^2 - 2x - 15)$$

$$\cancel{2x^2} + \cancel{x} - \cancel{37} = 3x^2 - 6x - 45$$

$$0 = x^2 - 7x - 8$$

$$0 = (x-8)(x+1)$$

$$x = 8, -1$$

(check

$$(8)^2 - 2(8) - 15$$

$$33 \checkmark$$

$$(-1)^2 - 2(-1) - 15$$

$$-14 \checkmark$$

2.)

$$\frac{1}{x^2 + 11x + 30} = \frac{1}{x+5} + \frac{x-6}{x+6}$$

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

$$1 = 1(x+6) + (x-6)(x+5)$$

$$1 = x + 6 + x^2 - x - 30$$

$$1 = x^2 - 24$$

$$\sqrt{25} = \sqrt{x^2}$$

$$\pm 5 = x$$

$$5, -5 = x$$

E.S.

check:

$$(5)^2 + 11(5) + 30 = 110$$

$$5 + 5 = 10 \checkmark$$

$$5 + 6 = 11 \checkmark$$

$$(-5)^2 + 11(-5) + 30 = 0$$

$$3.) \frac{4}{x-3} = \frac{(x-3)2}{x+1} + \frac{16}{x^2-2x-3}$$

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

$$\frac{4x+4}{(x-3)(x+1)} = \frac{2x-6}{(x-3)(x+1)} + \frac{16}{(x+1)(x-3)} \quad x-3$$

$$\frac{4x+4}{(x-3)(x+1)} - \frac{2x-6}{(x-3)(x+1)} - \frac{16}{(x+1)(x-3)} = 0$$

$$4x+4 = 2x-6+16 \quad 2x+10=16$$

$$\begin{array}{r} 4x+4 \\ +6 \\ \hline 4x+10 \end{array} = \begin{array}{r} 2x-6 \\ +6 \\ \hline 2x \end{array} + 16$$

$$\begin{array}{r} 2x+10 \\ -10 \\ \hline 2x \end{array} = \begin{array}{r} 16 \\ -10 \\ \hline 6 \end{array} \quad \emptyset$$

$$\frac{4x+10}{-2x} = \frac{2x+16}{2x} \quad \frac{2x}{2} = \frac{6}{2} \quad x=3$$

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

$$13. \frac{3x}{x+5} + \frac{1}{x-2} = \frac{7}{x^2+3x-10}$$

$$5. x + \frac{4x}{x-3} = \frac{12}{x-3}$$

$$17. \frac{3}{x+2} + \frac{6}{x^2+2x} = \frac{3-x}{x}$$

$$9. x + \frac{12}{x} = 7$$

$$23. \frac{2}{x-1} + x = 5$$

$$25. \frac{x^2-2x+1}{x+5} = 0$$

**Homework:** Pg. 232 #1, 5, 9, 13, 17, 23, 25  
Remember to check for extraneous solutions!!