Quiz tomorrow...
- Radical Equations
- Understanding absolute value $|-3+1| = 2$
- Simplifying rational expressions, identifying restrictions
- Multiplying and dividing rational expressions
- Adding and subtracting rational expressions

Solve the following... $\sqrt{3x+1} - \sqrt{x+4} = 1$ $\boxed{x=5}$

$3+4 \overset{?}{=} 7^2$

$9 + 16 \overset{?}{=} 49$ ✗

$\left(\sqrt{3x+1}\right)^2 = \left(1 + \sqrt{x+4}\right)^2$

$3x+1 = 1 + 2\sqrt{x+4} + x + 4$

$3x+1-1-x-4 = 2\sqrt{x+4}$

$\dfrac{2x-4}{2} = \dfrac{2\sqrt{x+4}}{2}$

$(x-2)^2 = \left(\sqrt{x+4}\right)^2$

$x^2 - 4x + 4 = x + 4$

$x^2 - 5x = 0$

$x(x-5) = 0$

$x = 0$ or $\boxed{x=5}$ ⟶

extraneous root

Verify:

$\sqrt{3x+1} - \sqrt{x+4} = 1$

$x = 0$

$\underset{LS}{\sqrt{1} - \sqrt{4}}$ $\underset{RS}{1}$

$1 - 2$
$= -1$ ✗

$x = 5$

$\underset{LS}{\sqrt{16} - \sqrt{9}}$ $\underset{RS}{1}$
$4 - 3$
1

$LS = RS$

What if the denominators are not monomials???

$$\frac{2}{x-2} - \frac{5}{x+8}$$

$$\frac{4}{x^2-16} + \frac{3}{x^2+8x+16}$$

$$= \frac{2(x+8) - 5(x-2)}{(x-2)(x+8)}$$

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

$$= \frac{2x+16 - 5x + 10}{(x-2)(x+8)}$$

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

$$= \frac{-3x+26}{(x-2)(x+8)} \checkmark$$

$$\frac{4x+16 + 3x - 12}{(x-4)(x+4)^2}$$

$$= \frac{7x+4}{(x-4)(x+4)^2}$$

$$\frac{\dfrac{1}{a} - \dfrac{3}{a^2}}{a}$$

Remember to ALWAYS factor everywhere possible FIRST!!!

$$\frac{2}{w} - \frac{3}{w-1} + \frac{2}{w+2}$$

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

$$\frac{2(w^2 + w - 2) - 3w^2 - 6w + 2w^2 - 2w}{w(w-1)(w+2)}$$

$$= \frac{w^2 - 6w - 4}{w(w-1)(w+2)}$$

$$\frac{4}{y^2 - 4} - \frac{2}{y+2}$$

$$\frac{4}{(y-2)(y+2)} - \frac{2}{y+2}$$

$$= \frac{4 - 2(y-2)}{(y-2)(y+2)}$$

$$= \frac{4 - 2y + 4}{(y-2)(y+2)}$$

$$= \frac{8 - 2y}{(y-2)(y+2)}$$

$$= \frac{2(4-y)}{(y-2)(y+2)}$$

Try these examples...Remember to FACTOR first!

$$\frac{x+2}{x^2-6x+5} - \frac{5}{x^2+2x-35}$$

$$\frac{2x}{x^2+4x-12} + \frac{3}{5x^4-20x^2}$$

$$\frac{x+2}{(x-5)(x-1)} - \frac{5}{(x+7)(x-5)}$$

$$\frac{(x+2)(x+7) - 5(x-1)}{(x-5)(x-1)(x+7)}$$

$$\frac{x^2+9x+14 - 5x+5}{(x-5)(x-1)(x+7)}$$

$$\frac{x^2+4x+19}{(x-5)(x-1)(x+7)}$$

Practice Problems...

Page 336 - 339
#1, 3, 5, 6, 7, 8,