Solving RATIONAL EQUATIONS

*Only possible when 1 fraction = 1 fraction

Example 1

USING CROSS PRODUCTS

AKA cross multiply

Example 2

MULTIPLY BY THE LCD

Example 3

FACTOR TO FIND THE LCD

=0
3=0
=-3
:fancus
you
t÷by0

Solving RATIONAL EQUATIONS

A $\frac{8}{(x+7)} = \frac{3}{(x-3)}$

$3(x+7) = 8(x-3)$

$3x+21 = 8x-24$

$-8x \quad -8x$

$-5x+21 = -24$

$-21 \quad -21$

$-5x = -45$

$-5 \quad -5$

$x = 9$

* Check for extraneous sol. by plugging x into the problem

You can't have 0 in denom!

B $\frac{x}{(3x-7)} = \frac{-3}{(x-5)}$

$-3(3x-7) = x(x-5)$ ← Quadratic Eq. so set everything = 0 + solve by factoring, quad. form, or sq. root method.

$-9x+21 = x^2-5x$

$+9x-21 \quad +9x-21$

$0 = x^2+4x-21$

$0 = (x+7)(x-3)$

$x+7=0 \quad x-3=0$

$x=-7 \quad x=3$

A $\frac{x}{(x+7)} + \frac{3}{1} = \frac{-1}{(x+7)}$

① LCD: $(x+7)$

② Write LCD next to each term in numerator.

③ Then cancel w/ denom.

④ Solve for x

$\frac{(x+7)x}{(x+7)} + \frac{3(x+7)}{1} = \frac{-1(x+7)}{(x+7)}$

$x - 3(x+7) = -1$

$x - 3x - 21 = -1$

$-2x - 21 = -1$

$+21 \quad +21$

$-2x = 20$

$-2 \quad -2$

$x = -10$

B $\frac{-2}{x-8} + x = \frac{7}{x-8}$ LCD: $(x-8)$

$\frac{-2(x-8)}{(x-8)} + \frac{x(x-8)}{1} = \frac{7(x-8)}{(x-8)}$

$-2 + x(x-8) = 7$

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

$-7 \quad -7$

$x^2 - 8x - 9 = 0$

$(x-9)(x+1) = 0$

$-9, 1, -9, -8$

$x=9 \quad x=-1$

A $\frac{x+6}{x^2-4} = \frac{3}{x+2}$

① Factor denom. to find LCD

LCD: $(x+2)(x-2)$

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

$x+6 = 3(x-2)$

$x+6 = 3x-6$

$-3x \quad +6 \quad -3x \quad -6$

$-2x = -12$

$x = 6$

B $\frac{1}{x+3} + 2 = \frac{x^2-3}{x^2+12x+27}$

LCD: $(x+3)(x+9)$

$\frac{1(x+9)}{(x+3)} + \frac{2(x+3)(x+9)}{1} = \frac{(x^2-3)(x+3)(x+9)}{(x+3)(x+9)}$

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

$x+9 + 2(x^2+12x+27) = x^2-3$

$x+9 + 2x^2+24x+54 = x^2-3$

$2x^2+25x+63 = x^2-3$

$-x^2 \quad +3 \quad -x^2+3$

$x^2+25x+66 = 0$

$(x+22)(x+3) = 0$

$x+22=0 \quad x+3=0$

$x=-22 \quad x=-3$ extraneous by you can't ÷ by 0