

Rational Equations w/ Polynomials

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

Variable in
Denominator

- 1) Find LCD LCD = $5n$
 - a) Number
 - b) Variable — Use the largest exponent
- 2) Multiply every Term by the LCD
- 3) Solve
- 4) Check for extraneous answers.

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$$\frac{5n}{5n} \left(\frac{1}{n} \right) = \frac{5n}{5n} \left(\frac{1}{5n} \right) - \frac{5n}{5n} \left(\frac{n-1}{5n} \right) \quad \text{LCD} = 5n$$

$$5 = 1 - (n-1)$$

$$5 = 1 - n + 1$$

$$5 = 2 - n$$

$$\begin{array}{r} -2 \\ -2 \\ \hline 3 = -n \end{array}$$

$$\boxed{-3 = n}$$

$$2n \cdot \frac{1}{5} \quad 1 + 5n = 2(n-1)$$

$$\begin{array}{r} 1 + 5n = 2n - 4 \\ -1 \quad -2n \quad -2n - 1 \\ \hline 3n = -5 \end{array}$$

$$\frac{3n}{3} = \frac{-5}{3}$$

$$\boxed{n = \frac{-5}{3}}$$

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

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

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

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

$$2x^2 = 2$$

$$\frac{2x^2}{2} = \frac{2}{2}$$

$$\sqrt{x^2} = \sqrt{1}$$

$$x = 1$$

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

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

$$x^2 - 4 \cdot 3 = x$$

$$x^2 - 12 = x$$

$$x^2 - x - 12 = 0$$

$$\text{Factor } (x-4)(x+3) = 0$$

$$\begin{array}{r|l} x-4=0 & x+3=0 \\ +4 & -3 \\ \hline x=4 & x=-3 \end{array}$$

$$\begin{array}{r|l} -1 & -12 \\ -1 & -4 \cdot 3 \end{array}$$

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