

Solve this Rational Equation Using Two Different Methods:

$$\frac{1}{6}x - \frac{2}{3} = \frac{1}{2}$$

Fraction Operations:

$$\begin{aligned} \frac{1}{6}x - \frac{4}{6} &= \frac{3}{6} \\ 6 \cdot \frac{1}{6}x &= \frac{7}{6} \cdot 6 \\ x &= 7 \end{aligned}$$

Clearing Fractions:

$$\begin{aligned} \left(\frac{1}{6}x - \frac{2}{3} = \frac{1}{2} \right) \cdot 6 \\ x - 4 = 3 \\ x = 7 \end{aligned}$$

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Solve $\frac{5}{24} + \frac{2}{3-x} = \frac{1}{4}$. Check your solution. **Solving Rational Equations:**

$$\cancel{2(3-x)} \frac{5}{24} + \frac{24 \cancel{(3-x)} 2}{\cancel{3-x}} = \frac{\cancel{6(3-x)} 1}{\cancel{4}}$$

$$5(3-x) + (24 \cdot 2) = 6(3-x)$$

$$15 - 5x + 48 = 18 - 6x$$

$$x = -45$$

- Factor
- Identify excluded values (denominator $\neq 0$) $x \neq 3$
- Find the least common multiple of the denominators
- Multiply equation by that LCM
- Simplify / Reduce
- Solve
- Check for Extraneous Solutions

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$$\frac{1}{x-1} = \frac{x}{x-1} + \frac{x}{6}$$

Solving Rational Equations:

1. Factor
2. Identify excluded values (denominator $\neq 0$) $x \neq 1$
3. Find the least common multiple of the denominators
4. Multiply equation by that LCM
5. Simplify / Reduce
6. Solve
7. Check for Extraneous Solutions

Handwritten work:

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

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

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

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

$$0 = x^2 + 5x - 6$$

$$(x+6)(x-1) = 0$$

$$x+6=0 \quad x-1=0$$

$$x=-6 \quad x=1$$

Check: $\frac{1}{-7} = \frac{-6}{-7} + \frac{-6}{6} \checkmark$

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$$\frac{16}{x^2-16} = \frac{2}{x-4}$$

Solving Rational Equations:

1. Factor
2. Identify excluded values (denominator $\neq 0$) $x \neq 4, x \neq -4$
3. Find the least common multiple of the denominators
4. Multiply equation by that LCM
5. Simplify / Reduce
6. Solve
7. Check for Extraneous Solutions

Handwritten work:

$$\cancel{(x+4)(x-4)} \frac{16}{\cancel{(x+4)(x-4)}} = \frac{2}{\cancel{x-4}} \cancel{(x+4)(x-4)}$$

$$16 = 2(x+4)$$

$$16 = 2x + 8$$

$$8 = 2x$$

$$4 = x$$

No Solution

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Solve $\frac{1}{3k} + \frac{2}{9k} < \frac{2}{3}$.

$9k\left(\frac{1}{3k} + \frac{2}{9k} = \frac{2}{3}\right)$

$3 + 2 = 6k$

$5 = 6k$

$k = \frac{5}{6}$

$k \neq 0$

$k < 0$
or
 $k > \frac{5}{6}$

1. Factor

2. Identify excluded values (denominator $\neq 0$) $k \neq 0$

3. Solve the related equation.

4. Use the values of the solution and the excluded value to divide a number line into intervals.

5. Test a value in each interval to figure out which interval satisfies the inequality.

$\frac{1}{3(-1)} + \frac{2}{9(-1)} < \frac{2}{3}$

$-\frac{1}{3} - \frac{2}{9} < \frac{2}{3}$

$-\frac{3}{9} - \frac{2}{9} < \frac{2}{3}$

$-\frac{5}{9} < \frac{2}{3}$

$\frac{1}{3} + \frac{2}{9} < \frac{2}{3}$

$\frac{3}{9} + \frac{2}{9} < \frac{2}{3}$

$\frac{5}{9} < \frac{2}{3}$

$3\left(\frac{1}{3}\right) + 9\left(\frac{1}{3}\right) < \frac{2}{3}$

$1 + 3 < \frac{2}{3}$

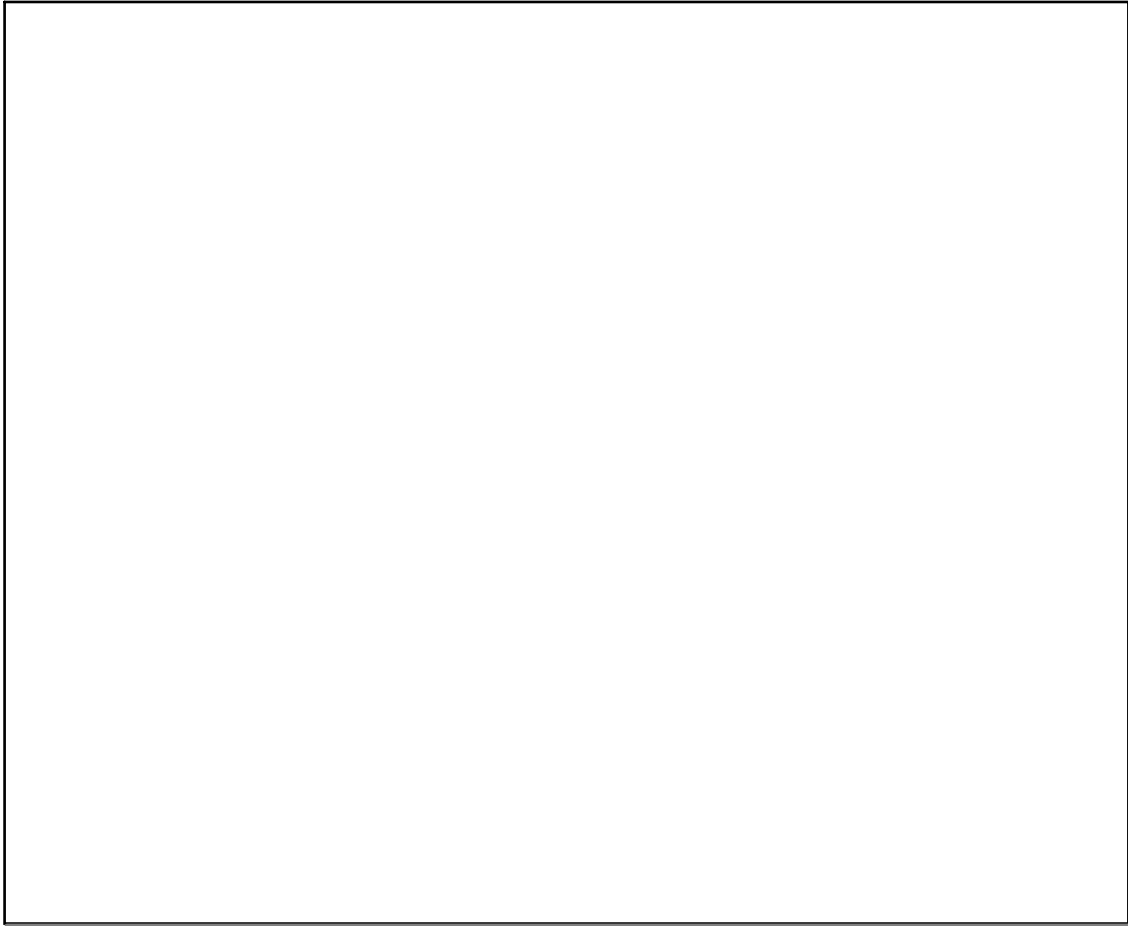
$4 < \frac{2}{3}$

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$$\frac{3}{2x} - \frac{2}{x} > \frac{1}{4}$$

$$-2 < x < 0$$

Feb 15-12:03 PM



Feb 15-1:19 PM