

## Solving Equations with Fractions

Example:  $\frac{1}{4}x + \frac{1}{2} = \frac{5}{2}$

- 1) Find the least common multiple of the denominators. You can do this with a list of multiples.

The multiples of 4 are:  $4 \times 1, 4 \times 2, 4 \times 3, \dots = 4, 8, 12, \dots$

The multiples of 2 are:  $2 \times 1, 2 \times 2, 2 \times 3, \dots = 2, 4, 6, \dots$

The two lists above share a 4. This is the least common multiple.

2) Setup the multiplication by the 4:  $4 \left( \frac{1}{4}x + \frac{1}{2} \right) = 4 \left( \frac{5}{2} \right)$

3) Distribute the 4 into the parenthesis:  $\frac{4 \times 1}{4}x + \frac{4 \times 1}{2} = \frac{4 \times 5}{2}$

4) Multiply in the numerators:  $\frac{4}{4}x + \frac{4}{2} = \frac{20}{2}$

5) Perform the divisions:  $1x + 2 = 10$

6) Subtract 2 from both sides:  $1x + 2 - 2 = 10 - 2$

7) Actually carry out the subtraction:  $1x = 8$

8) Rewrite the  $1x$  as just  $x$ :  $x = 8$

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Example:  $\frac{1}{4}x + \frac{1}{3} = \frac{5}{2}$

1) Find the least common multiple of the denominators. You can do this with a list of multiples.

The multiples of 4 are:  $4 \times 1, 4 \times 2, 4 \times 3, \dots = 4, 8, 12, \dots$

The multiples of 2 are:  $2 \times 1, 2 \times 2, 2 \times 3, 2 \times 4, 2 \times 5, 2 \times 6, \dots = 2, 4, 6, 8, 10, 12, \dots$

The multiples of 3 are:  $3 \times 1, 3 \times 2, 3 \times 3, 3 \times 4, \dots = 3, 6, 9, 12, \dots$

The two lists above share a 12. This is the least common multiple.

2) Setup the multiplication by the 12:

$$12 \left( \frac{1}{4}x + \frac{1}{3} \right) = 12 \left( \frac{5}{2} \right)$$

3) Distribute the 12 into the parenthesis:

$$\frac{12 \times 1}{4}x + \frac{12 \times 1}{3} = \frac{12 \times 5}{2}$$

4) Multiply in the numerators:

$$\frac{12}{4}x + \frac{12}{3} = \frac{60}{2}$$

5) Perform the divisions:

$$3x + 4 = 30$$

6) Setup the subtraction of 4 from both sides:

$$3x + 4 - 4 = 30 - 4$$

7) Actually carry out the subtraction:

$$3x = 26$$

8) Setup the division by 3 on both sides:

$$\frac{3x}{3} = \frac{26}{3}$$

9) Write the final result:

$$x = \frac{26}{3}$$

10) To write this as a mixed number, divide as shown below.

$$\begin{array}{r} 8 \\ 3 \overline{)26} \\ \underline{-24} \phantom{0} \\ 2 \phantom{0} \end{array}$$

$$x = 8\frac{2}{3}$$