

Accuplacer Study Modules

TOPIC: Solving Linear Equations with Fractions

Khan Academy Link: <https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-variables-expressions/cc-8th-two-step-equations-dec-fraction/v/two-step-equations-with-decimals-and-fractions>

Sample Problem 1:

Solve the equation: $4x + \frac{3x}{2} = 33$

Note 1: You need to remember that you cannot add or subtract fractions unless they have a **common denominator!**

Note 2: this problem can be handled in two very different ways. The first method will result in a fractional equation. The second method will result in an equivalent equation that has no fractions.

Method 1 – get common denominators	Method 2 – eliminate fractions
$4x + \frac{3x}{2} = 33$ Since the denominator of the fraction is 2, we need to get a denominator of 2 in the first term	$4x + \frac{3x}{2} = 33$ Find the least common denominator of ALL the fractions in the equation and multiply the entire equation by that value. The denominators are 1 and 2. The least common denominator is 2
$\frac{4x \cdot 2}{1 \cdot 2} + \frac{3x}{2} = 33$ Multiply the numerator and denominator of the term 4x by 2	$2(4x + \frac{3x}{2} = 33)$ Multiply the entire equation by the least common denominator (2)
$\frac{8x}{2} + \frac{3x}{2} = 33$ Simplify the first term	$2 * 4x + 2 * \frac{3x}{2} = 2 * 33$ Distribute the 2
$\frac{8x+3x}{2} = 33$ Add the numerators	$8x + 3x = 66$ Combine like terms
$\frac{11x}{2} = 33$ Simplify the numerator (in this case you combine like terms).	$11x = 66$ Divide both sides of the equation by 11
$2(\frac{11x}{2}) = 2(33)$ Multiply both sides of the equation by 2.	$x = 6$ Record your answer
$11x = 66$ Divide both sides of the equation by 11	
$x = 6$ Record your answer	

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Sample Problem 2:

Solve for x: $\frac{2x-5}{4} = \frac{3x+2}{3}$

Note: Because this problem is a proportion (2 fractions that are equal to each other) you can solve the problem by using cross products. If 2 fractions are equal then their cross products are equal.

Khan Academy link for this type of problem: <https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/ratios-core-algebra/v/find-an-unknown-in-a-proportion>

$$\frac{2x-5}{4} = \frac{3x+2}{3}$$

Cross multiply to get rid of the fractions.

$$3(2x - 5) = 4(3x + 2)$$

Distribute on each side of the equation

$$6x - 15 = 12x + 2$$

Get all variables on one side of the equation

$$\begin{array}{r} -12x \quad -12x \\ \hline \end{array}$$

$$-6x - 15 = 2$$

Add 15 to both sides

$$\begin{array}{r} \quad +15 \quad +15 \\ \hline \end{array}$$

$$-6x = 17$$

Divide both sides by -6

$$x = -\frac{17}{6}$$

Report your solution: $x = -\frac{17}{6}$

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TOPIC: **Solving Linear Equations with Fractions**

Instructions: Solv each equation.

1. $3x - \frac{2x}{5} = 26$

2. $\frac{x}{3} = \frac{x+5}{4}$

3. $\frac{2x-4}{5} = \frac{3x+3}{3}$

4. $\frac{2x}{3} + \frac{4x}{2} = 16$