Lesson #54 – Solving Equations with Rational Numbers

Recall that a **RATIONAL NUMBER** is a number that can be written as a fraction or a terminating or repeating decimal.

Great news! You already know how to solve equations with rational numbers.

Example 1) Solve the following equation: $\frac{7}{8}x + 2 = 16$

Steps to solving equations with rational numbers:

Steps	Example
1) Use the distributive property if necessary.	
2) Combine like terms if necessary	
3) Solve the resulting equation.	$\frac{7}{8}x+2=16$ $-2\ -2$ $\frac{7}{8}x=14$ $\frac{\frac{7}{8}x}{\frac{7}{8}}=\frac{14}{\frac{7}{8}}$ $x=16$

Some helpful hints when solving equations with rational numbers

1) When you see fractions or decimals, **don't panic**. The steps to solving these equations are exactly the same as the equations we've been working with.

2) It may be helpful to turn certain fractions into decimals before solving these equations.

3) **NEVER USE REPEATING DECIMALS WHEN SOLVING THESE EQUATIONS. IF A FRACTION TURNS INTO A REPEATING DECIMAL, LEAVE IT AS A FRACTION.**

4) If leaving numbers as fractions, be sure to use the $A\ ^{b}/_{c}$ button on your calculator when performing any operations with the fractions.

Example 2) Solve the following equation: $\frac{1}{2}x + \frac{1}{3}x - 20 = -10$

$\frac{5}{6}x - 20 = -10$

$+20 \quad +20$

$\frac{5}{6}x = 10$

$\frac{5}{6} \quad \frac{5}{6}$

$x = 12$

Example 3) Solve the following equation: $9.5(6.5 - 6x) = -27.5$

$61.75 - 57x = -27.5$

$-61.75 \quad -61.75$

$-57x = -89.25$

$-57 \quad -57$

$x = 1.6$

Now, You Try!

Solve each equation. Round your answer to the nearest hundredth if necessary.

4) $x - \frac{2}{5} = \frac{8}{5}$

$+\frac{2}{5} \quad +\frac{2}{5}$

$x = 2$

$x = 2$

(-1)

5) $0.75(2x + 1) = 2$

$0.75(2x+1=2$

$1.5x + 0.75 = 2$

$-0.75 \quad -.75$

$1.5x = 1.25$

$x = .83$

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

$+\frac{4}{5} \quad +\frac{4}{5}$

$\frac{2}{5}x = -2\frac{1}{5}$

$\frac{2}{5} \quad \frac{2}{5}$

$x = -5\frac{1}{2}$

7) $9.4x + 0.8 = 18.24$

$-0.8 \quad -0.8$

$9.4x = 17.44$

$9.4 \quad 9.4$

$x = 1.85$

8) $\frac{3}{2}x - 2 = 7$

$+2 \quad +2$

$\frac{3}{2}x = 9$

$\frac{3}{2} \quad \frac{3}{2}$

$x = 6$

9) $3.5x + 2.7 - 1.4x = 17.4$

$2.1x + 2.7 = 17.4$

$-2.7 \quad -2.7$

$2.1x = 14.7$

$2.1 \quad 2.1$

$x = 7$