Fractions in Equations

Often it is easier to solve an equation that has coefficients that are fractions if you "get rid" of the fractions. You need to be careful to keep everything equal as you do so.

Example: $\frac{3}{5}x - x = \frac{x}{15} - \frac{7}{3}$

Approach: The denominators of each term (5, 1, 15, and 3) all will divide into 15, so if you multiply <u>each</u> and <u>every</u> term on <u>both</u> sides of the equal sign by 15, the equality is still true, but you won't have to deal with finding a common denominator. (Technically, you made the common denominator 1 by doing this.)

$$15 \cdot \left(\frac{3}{5}x\right) - 15 \cdot (x) = 15 \cdot \left(\frac{x}{15}\right) - 15 \cdot \left(\frac{7}{3}\right)$$

$$\left(\frac{\cancel{15}^3}{1} \cdot \frac{3}{5}\right)x - 15x = \left(\frac{15}{1} \cdot \frac{1}{\cancel{15}}\right)x - \left(\frac{\cancel{15}^3}{1} \cdot \frac{7}{3}\right)$$

$$\underline{9x - 15x} = x - 21 \quad \leftarrow \text{Now solve as usual.}$$

Sidenote: Remember that you can always turn any integer into a fraction by dividing by 1.

$$-6x = x - 21$$
$$\underline{-x \qquad -x}$$

$$\frac{-7x}{-7} = \frac{-21}{-7}$$

$$x = +3$$

Solution set: $\{3\}$