Equations with Fractions 2

Example 1. Also in this situation, it makes sense to start by multiplying out the denominators. We use 12 since it is a common multiple of both 3 and 4.

Notice how things simplify in the next step.

Checking the solution, we get:

$$\frac{11.5 + 5}{3} \stackrel{?}{=} \frac{2(11.5) - 1}{4}$$

$$\frac{16.5}{3} \stackrel{?}{=} \frac{23 - 1}{4}$$

$$5.5 = 22/4$$

$$\begin{aligned}
\frac{x+5}{3} &= \frac{2x-1}{4} && \Big|\ \cdot 12 \\
\cancel{12} \cdot \left(\frac{x+5}{\cancel{3}}\right) &= \cancel{12} \cdot \left(\frac{2x-1}{\cancel{4}}\right) && \text{(Simplify.)} \\
4(x+5) &= 3(2x-1) \\
4x + 20 &= 6x - 3 && \Big|\ -6x \\
-2x + 20 &= -3 && \Big|\ -20 \\
-2x &= -23 && \Big|\ \div 2 \\
x &= 11\tfrac{1}{2}
\end{aligned}$$

1. Solve. Can you think of two different ways to start the solution? *Hint:* Again it will be handy to check the solutions with a calculator using a decimal approximation of the root.

a. $\dfrac{3x-4}{2} = \dfrac{3x+1}{5}$	**b.** $\dfrac{15-2s}{8} = \dfrac{5s-1}{2}$

2. What errors are made in these solutions? Correct them, and continue the solutions.

a.
$$\begin{aligned}
\frac{3x-4}{2} - 5 &= 7 && \Big|\ \cdot 2 \\
3x - 4 - 5 &= 14
\end{aligned}$$

b.
$$\begin{aligned}
3 - x &= 2x + \frac{x-10}{2} && \Big|\ \cdot 10 \\
30 - x &= 2x + 5x - 50
\end{aligned}$$

3. Solve. What is different about the two equations (a), and (b)? How does that affect the solution process?

a. $2x + \dfrac{5-x}{6} = 4$	**b.** $2x - \dfrac{5-x}{6} = 4$

4. Practice some more!

a. $\dfrac{3x-8}{10} - 1 = x$	**b.** $11 = 3y + \dfrac{5-5y}{3}$
c. $0 = \dfrac{3x-2}{4} + \dfrac{x+2}{5}$	**d.** $-x + \dfrac{1-3x}{2} = \dfrac{x}{3} + 2$

5. Solve equations involving decimals, also. Hint: In (c), you can cross-multiply. Use a calculator. Give your final answer rounded to two decimals.

a. $\dfrac{3.2x - 1}{5} = 0.9x$	**b.** $0.08x - \dfrac{0.1x}{4} = 0.2$
c. $\dfrac{20x - 4.3}{0.4} = \dfrac{3.89x}{2.5}$	**d.** $5.4 - \dfrac{0.3 - x}{4} = \dfrac{x}{2}$

6. Check what happens if you start the solution of this equation by multiplying both sides by **5** (not by 10).

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

$$=$$

Puzzle Corner

Andrea put forth a puzzle: "The sides of my rectangle are consecutive whole numbers, and the area is between 3,200 and 3,400 square units." What are the sides of Andrea's rectangle?