

Solving Equations: Simplifying Before Solving | MFM2P

Motivation: A photographer charges a sitting fee of \$100. The first 4 prints are free, and each additional print costs \$5.25. If your maximum budget for prints is \$257.50, how many prints could you afford?

We can model this situation with the following "word equation":

$$\$100 + \$5.25 \times (\# \text{ of prints} - 4 \text{ free prints}) = \$257.50$$

Let's turn this into an algebraic equation, using "p" for the # of prints. Then let's use our skills from the warmup to finish solving the equation.

Equation:	$100 + 5.25(p - 4) = 257.5$
Apply the distributive law (if necessary):	$(100) + 5.25p - 21 = 257.5$
Simplify each side (if necessary):	$5.25p + 79 = 257.5$ $\quad \quad -79 \quad -79$
Solve the remaining equation:	$\frac{5.25p}{5.25} = \frac{178.5}{5.25}$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">$p = 34 \text{ prints}$</div>

Let's try another:

Equation:	$3(x - 2) = 2(x - 1)$
Apply the distributive law (if necessary):	$3x - 6 = 2x - 2$ $-2x \quad \quad -2x$
Simplify each side (if necessary):	$x - 6 = -2$ $\quad +6 \quad +6$
Solve the remaining equation:	<div style="border: 1px solid black; padding: 5px; display: inline-block;">$x = 4$</div>

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Equation:	$4(x + 2) + 3x = 43$ $4x + 8 + 3x = 43$ $7x + 8 = 43$ $\begin{array}{r} -8 \quad -8 \\ \hline 7x = 35 \\ \frac{7x}{7} = \frac{35}{7} \\ \boxed{x = 5} \end{array}$
Apply the distributive law (if necessary): ✓	
Simplify each side (if necessary): ✓	
Solve the remaining equation:	

Why don't you try the following, without the structure above:

a) $6(x - 2) = 18$

b) $5(x - 2) = 7x - 20$

c) $2(x + 5) = 6(x + 1)$

d) $2(x + 1) + 3(x + 2) = 18$