

Remembering: Expressions/Equations/Inequalities

While we are going to be learning how to solve equations, it is always important that we remember the differences between those three math constructions: *expressions*, *equations* and *inequalities*. Let's again list what to look for in each:

Expressions

Equations

Inequalities

Solving One-Step Equations

When solving any type of equation, the goal is to isolate the variable. That is, in the end, we want the equation to look like $x = \underline{\hspace{2cm}}$. The simplest way to do this is to follow these steps:

1. Locate the variable
2. Notice the operation that is happening to the variable. (Addition, Subtraction, Multiplication, Division)
3. To undo that operation, apply the opposite operation to both sides of the equation:
 - Addition \rightarrow Subtraction
 - Subtraction \rightarrow Addition
 - Multiplication \rightarrow Division
 - Division \rightarrow Multiplication
4. Check your answer by substituting it into the equation and seeing if it works.

Let's practice with a few examples:

• $x - 7 = 21$

• $x + 4 = 18$

• $3x = 18$

• $\frac{x}{3} = 6$

• $x + 8 = 6$

• $35 = -5x$

Now, it's time for you to practice on your own.

1. Solve each equation for the variable:

(a) $8 + x = 16$

(b) $8x = 16$

(c) $\frac{x}{4} = 2$

(d) $x - 2 = 4$

$$(e) -2x = 10$$

$$(f) -6 = x - 10$$

$$(g) -x = -20$$

$$(h) 40 = -2x$$

$$(i) 16 = -8 + x$$

$$(j) -4 + x = 8$$

$$(k) x + 8 = 4$$

$$(l) 25 = -5x$$

The following exercises are meant to remind you that not every exercise is an equation. When we have expressions instead of equations, we can't solve for anything. We can only simplify the expression.

2. Simplify each expression:

(a) $0.5(8x - 6y) - 4(2x - 3y)$

(b) $-3x(2x - 5)$

(c) $-4x + 9x - 7x + 2x$

(d) $-7(4x + 5) - (9x - 8)$