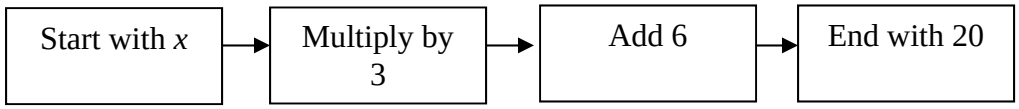
Solving linear equations NAME:

The point of solving an equation is to find the value(s) of the variable that make the equation true. This worksheet focuses on undoing what was done to the variable in order to uncover it. Equations with just one instance of the variable can usually be solved this way. Once we master these equations, the same procedures (adding, subtracting, multiplying by, or dividing by a number on both sides of the equation) can be used to solve more difficult equations.

For instance, let's say we want to solve the equation $3x + 6 = 20$. The verbal model that describes this equation is the following.



So if we undo these operations (in reverse order) we should be able to uncover the *x*. Remember we'll do these reverse operations to both sides of the equation. While we uncover the *x* on the left side, the solution will form on the right. The solution is written explicitly below.

$3x + 6 = 20$

(subtract 6 from both sides)

$3x = 14$

(divide both sides by 3)

$x = 14/3 \approx 4.67$

Check this answer by putting it back into the original equation and seeing if the equation is true. Below I show this with the fraction or the decimal equivalent. Choose whichever you like.

$3(14/3) + 6 \overset{?}{=} 20$ or $3 * 4.67 + 6 \overset{?}{=} 20$

Does it work?

Remember this worked because "subtracting 6" undid the "plus 6" of $3x + 6 = 20$. Likewise "dividing by 3" undid the "3 times" of $3x = 14$.

For each equation, write in words what is happening to the variable *x*. Use the verbal model form with the boxes shown on page 1. Then solve the equation. Notice to solve it, you are undoing what was done to *x*. Circle your solution.

1.) $4x - 7 = 16$

2.) $10 - 5x = 25$ (It works best if you think of this as $10 + -5x = 25$.)

3.) $3x + 4 = 31$

4.) $16 = \frac{x}{2} - 3$

5.) $3(x+4) = 9$ (You do **not** need to simplify it as $3x + 12 = 9$ first. Please do not.)

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