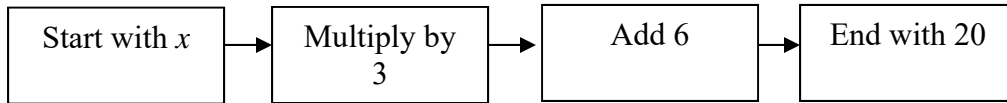


Solving linear equations

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.

$$\begin{aligned}
 3x + 6 &= 20 && \text{(subtract 6 from both sides)} \\
 3x &= 14 && \text{(divide both sides by 3)} \\
 x &= \frac{14}{3} \approx 4.67
 \end{aligned}$$

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.

$$3\left(\frac{14}{3}\right) + 6 \stackrel{?}{=} 20 \quad \text{or} \quad 3 * 4.67 + 6 \stackrel{?}{=} 20$$

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

1.) $4x - 7 = 16$

2.) $3x + 4 = 31$

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

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