Name: _____ Date: _____

SOLVING ONE STEP EQUATIONS WITH ADDITION & SUBTRACTION
N-GEN MATH® 6

Equations are statements about the **equality of two expressions** that could be **true** or **false**. **Solutions** to equations are the **values** of the variables **that make the equations true**. In this lesson we see how to **solve** an equation.

SOLVING EQUATIONS

To **solve** an equation means to **find all solutions** to the equation, in other words to find all the values of the **variable** that make the equations true.

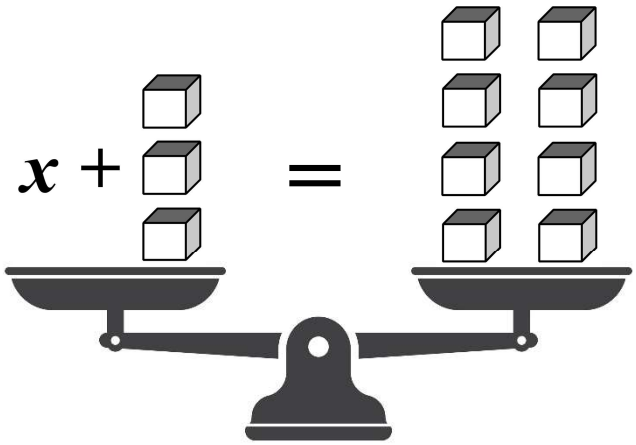
***Exercise* #1:** For each of the following, state whether the value of the variable is a **solution** to the equation. Justify.

(a) $x+3=8,\ x=7$

(b) $a+\frac{1}{2}=\frac{3}{4},\ a=\frac{1}{4}$

***Exercise* #2:** The **balance scale** below shows a representation of the equation in *Exercise* #1(a), with x being an unknown number of blocks on the left-hand side.

(a) The equation will only be **true** in this model if the scale is **balanced**. Why does this make sense?



(b) In order to have the variable x by itself (**isolated**) on the **left-hand side** of the equation, what would we need to do on the scale?

(c) To keep the scale balanced what would we need to do to the **right-hand side** of the equation? Show both by crossing off blocks in the model.

(d) Solve the equation by going through the same steps on the equation. Show your work.

$$x+3=8$$

We can think about an equation as being like a **scale**. To keep the equation **true** we need to keep the scale **balanced** by performing the same **operation** to each side of it. We can use this fact to solve a whole variety of equations like the ones in Exercise #1.

***Exercise* #3:** Solve each of the following equations using subtraction. Show your work.

(a) $n+8=19$ (b) $c+42=97$ (c) $x+\frac{1}{3}=\frac{5}{6}$

***Exercise* #4:** Samantha has 22 tickets for the fair. Samantha has 8 tickets more than Mia. Let the variable m represent the number of tickets Mia has. Write an equation involving m that can be used to find the number of tickets Mia has. Then, solve it.

Let $m=$ the number of tickets Mia has

We can solve equations that involve **subtraction** as well.

***Exercise* #5:** Nathan has an unknown number of cookies. He gave four away and was left with only two. This can be modeled with the equation $n-4=2$.

(a) What is the solution to this equation? (Use common sense.)

(b) What could you do to both sides of this equation to get the answer to (a)? Show in the equation below.

$$n-4=2$$

***Exercise* #6:** Solve each of the following equations using addition. Show your work.

(a) $x-10=17$ (b) $d-26=54$ (c) $m-7=28$

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SOLVING ONE STEP EQUATIONS WITH ADDITION AND SUBTRACTION
N-GEN MATH® 6 HOMEWORK

FLUENCY

1. Solve each of the following equations. Be mindful of which operation you will need to isolate the variable. Show the work that leads to your answers.

(a) $x + 9 = 20$ (b) $n + 22 = 70$ (c) $c + 14 = 15$

(d) $g - 6 = 14$ (e) $y - 11 = 24$ (f) $w - 12 = 17$

(g) $n + 15 = 27$ (h) $m - 7 = 11$ (i) $x - 34 = 71$

(j) $y - 22 = 4$ (k) $x + 12 = 54$ (l) $k - 4 = 17$

2. The value $x = 7$ is a solution to all the equations below except for one of them. Which one is it not a solution to?

(1) $x - 6 = 1$ (3) $x - 3 = 10$

(2) $x + 10 = 17$ (4) $x + 5 = 12$

USING YOUR MATH

3. Ava scored 18 points in a basketball game. She scored seven points more than Claire. Let c be the number of points scored by Claire. Set up an equation that lets you solve for the value of c. Then, solve it for Claire's score and place it in the box.

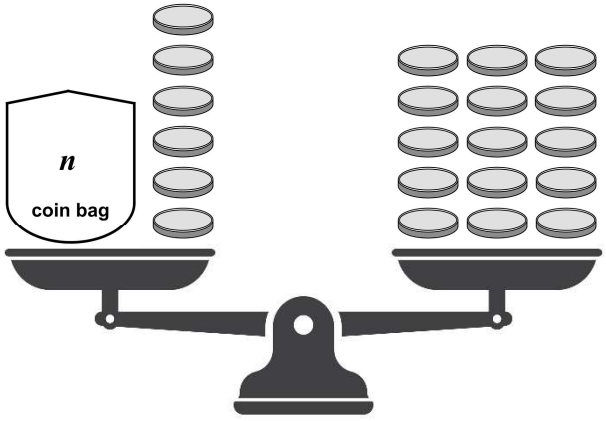
Claire's score = ☐

4. Evie brought money to the fair. After spending $12 on food, she had $5 left. Let m be the amount of money that Evie brought to the fair. Set up an equation that lets you solve for the value of m. Solve your equation to find the amount of money that Evie brought and place it in the box.

Amount of money = ☐

5. Dominic has an unknown number of quarters in a bag. He knows that when he places them on a scale and adds six more quarters to the same side, it will balance with 15 quarters on the right side.

   (a) Let n be the number of coins in the bag. Write an equation that you can solve for n and solve it below.



   (b) Show the same process by crossing (subtracting) out the same number of coins from both sides of the scale