

Unit: Equations in One Variable

LESSON 6 NOTES

MODELING EQUATIONS

EQ: How can I communicate real world ideas mathematical?

8.EE.7 8.EE.7a

Practices 1, 3, 5

What is equivalence and how is it maintained when solving an equation?

Goal: Use the Properties of Equality to solve equations with variable on both sides.

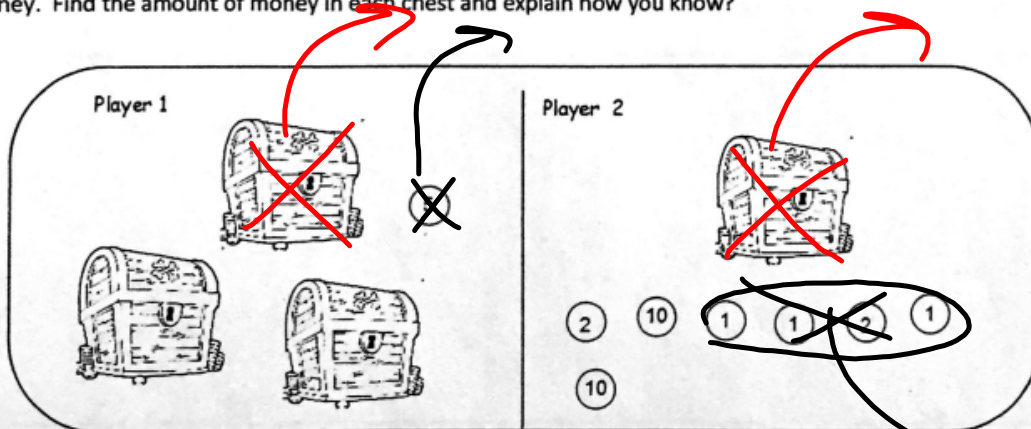
Each player has the same amount of money at the start of a video game. The diagram shows the amount of money each player starts with. If each chest contains the same amount of money how much money must each chest contain? How do you know?



- ① Took \$6 from each side
- ② Divided both sides by 3

$$\begin{array}{r}
 3x + 6 = 30 \\
 \underline{-6 \quad -6} \\
 3x = 24 \\
 \underline{\quad \quad 3 \quad 3} \\
 x = 8
 \end{array}$$

Now try this one. Remember, each player has the same amount of money *and* each chest contains the same amount of money. Find the amount of money in each chest and explain how you know?



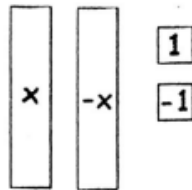
① Remove \$5 from both sides

② Remove 1 chest from both sides

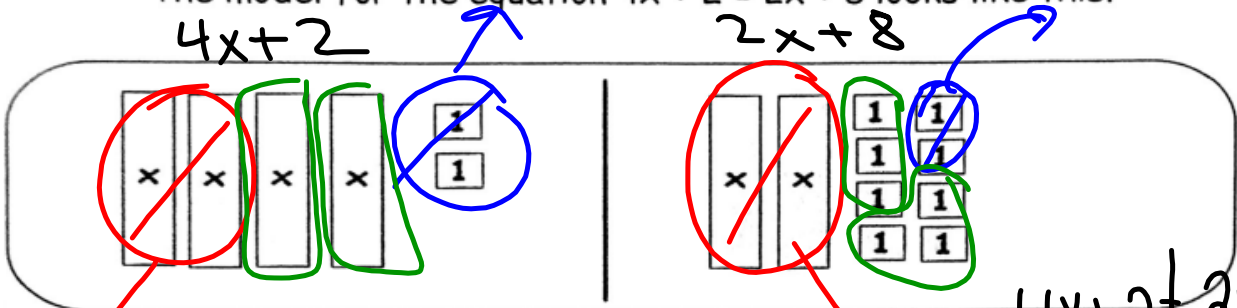
③ Divide by 2.  
\$11 in each chest.

$$\begin{array}{r}
 3x + 5 = 1x + 27 \\
 \underline{-5 \qquad -5} \\
 3x = 1x + 22 \\
 \underline{-1x \quad -1x} \\
 2x = 22 \\
 \underline{\div 2 \quad \div 2} \\
 \boxed{x = 11}
 \end{array}$$

In algebra we can model equations using these shapes. Then we can use groupings and arrows to show how we would solve it.



The model for the equation  $4x + 2 = 2x + 8$  looks like this.



Steps for solving

1. Remove 2  $x$  from both sides
2. Remove 2  $1$  from both sides
3. Divide both sides by 2.
4. The value of  $x$  is 3.

$$\begin{array}{r}
 4x + 2 = 2x + 8 \\
 -2x \quad -2x \\
 \hline
 2x + 2 = 8 \\
 -2 \quad -2 \\
 \hline
 2x = 6 \\
 \div 2 \quad \div 2 \\
 x = 3
 \end{array}$$

