Algebra 1 Name: _____

Date: _____ Period:

Solving One Step Equations – Guided Notes

I. Equations

A. Vocabulary

- An equation is a mathematical sentence with an equal sign.
  - The following are all considered to be equations:

Ex) $9 + 2 = 11$

Ex) $x + 7 = 37$

Ex) $a + (-3) = 2a + 5$

- A solution of an equation is a value for a variable that makes an equation true

You substitute a number for a variable to determine whether the number is a solution of the equation.

Examples

Directions: Is the given number a solution for the equation? **Please show how you arrived at your answer.**

Ex) $170 + x = 200$, for $x=30$

$170 + 30 = 200$

$200 = 200$

True; solution

Ex) $3 = 12 - a$, for $a=6$

$3 = 12 - 6$

$3 \neq 6$

not a solution

Ex) $9 - m = 3$, for $m=6$

$9 - 6 = 3$

$3 = 3$

solution

Ex) $8 + t = 2t$, for $t=3$

$8 + 3 = 2(3)$

$11 \neq 6$

not a solution

II. Solving One-Step Equations

A. Important Rules for Solving Equations

Rule #1) When you solve an equation, your goal is to get the variable alone by itself on one side of the equation.

In other words, you are trying to isolate the variable.

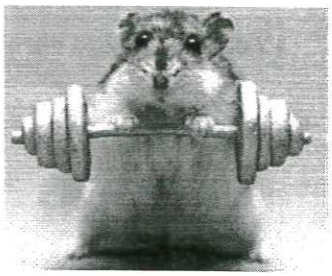
Rule #2) When you are solving for a variable, you **MUST** use inverse operations to isolate the variable on one side of the equation.

****Rule #3)** Whatever you do to one side of an equation, you must do to the other side of the equation.

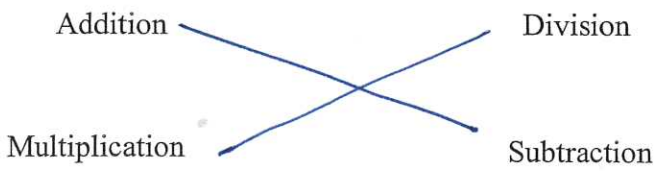
In other words, you must keep the equation balanced.

- Think of solving an equation like lifting weights.

If you Add (+) or Subtract (−) weight from one side of the barbell, you must + or − the same amount of weight from the other side of the barbell to keep it balanced.



Please draw a line between the inverse operations.



B. Solving One-Step Equations by Adding or Subtracting

- When you are solving an equation, you **MUST** use the inverse operation to isolate the variable on one side of the equation.

- REMEMBER: If you ___ _____ or _____ a number from one side of the equation, you must ___ _____ or the number from the other side of the equation.

Examples

Directions: Solve each equation for the variable.

Ex) $x + 4 = 6$

$-4 \quad -4$

$x = 2$

Check:

$x + 4 = 6$

$2 + 4 = 6$

$6 = 6$ ✓

Ex) $y - 5 = 12$

$+5 \quad +5$

$y = 17$

Check:

$17 - 5 = 12$

$12 = 12$ ✓

Directions: Solve each equation.

Ex) $d + 1 = 5$

$-1 \quad -1$

$d = 4$

Ex) $x + 11 = 3$

$-11 \quad -11$

$x = -8$

Check:

$x + 11 = 3$

$-8 + 11 = 3$

$3 = 3$ ✓

Ex) $p - 30 = 42$

$+30 \quad +30$

$p = 72$

Check:

$72 - 30 = 42$

$42 = 42$ ✓

- Notice that you can express one-step equations in different ways. It does not change how you go about solve the equation.

2 + t = 5

Directions: Solve each

equation. Ex) 11 = t + 2

-2 -2

9 = t

Ex) 21 = r – 5

+5 +5

26 = r

- Whenever you see a variable, it is understood to have a **1 in front of it.**

Ex) y – 4 = 4

Ex) x = -14

E. Solving One-Step Equations by Multiplying or Dividing

- When you are solving an equation, your goal is to use the **inverse** operation to isolate the variable on one side of the equation.

Examples

Directions: Solve each equation.

Ex) 2p = 18

2 2

p = 9

Ex) 4x = 8

4 4

x = 2

Ex) $14 \cdot \frac{z}{14} = 2 \cdot 14$

z = 28

ex1) $\frac{16}{4} = \frac{4b}{4}$

$4 = b$

ex2.) $85 = \frac{d}{8} \cdot 8$

$40 = d$

ex3.) $\frac{20}{5} = \frac{5c}{5}$

$4 = c$

$\frac{7}{1} \cdot \frac{1}{7} x = 2 \cdot \frac{7}{1}$

$x = 14$

$\frac{3}{2} \cdot \frac{2}{3} x = \frac{5}{1} \cdot \frac{3}{2}$

$x = \frac{15}{2} = 7\frac{1}{2}$

* if you have a fraction, multiply by the reciprocal.

III. Solving One-Step Equations with Negative Integers

Directions: Solve each equation.

Ex) d + 3 = -6

* Ex) x + (-8) = 12

+8 +8

x = 20

Ex) -t + 5 = 9

-5 -5

-t = 4

t = -4

Ex) –p + 6 = -7

Ex) b – 11 = -9

Ex) -e – 3 = 7

Ex) –g – 4 = -3

Directions: Solve each equation.

Ex) $-x = 12$

$x = -12$

Ex) $-g = -5$

$g = 5$

Ex) $-x = 33$

Directions: Solve each equation.

Ex) $\frac{r}{-5} = 10 \cdot -5$

$r = -50$

Ex) $\frac{k}{2} = -6 \cdot 2$

$k = -12$

Ex) $\frac{t}{-4} = -20 \cdot -4$

$t = 80$

Directions: Solve each equation.

Ex) $\frac{-x}{8} = 8$

Ex) $\frac{-r}{2} = -13$

Ex) $\frac{-c}{-5} = -12 \cdot -5$

$-c = 60$

$c = -60$