DAY 2: SOLVING TWO STEP EQUATIONS

OBJECTIVE: To solve two step equations in one variable.

- **Describe operations used to solve equations.**
- **Use an equation as a model.**

ESSENTIAL UNDERSTANDING: To solve two step equations, you can use the properties of equality and inverse operations to form a series of simpler equivalent equations. You can use the properties of equality repeatedly to isolate the variable.

LESSON:

SOLVING A TWO STEP EQUATION:

1) $2x + 3 = 15$

2) $5 = \frac{t}{2} - 3$

3) $-1 = 7 + 8x$

4) $-5x - 2 = 13$

5) $10 + \frac{h}{3} = 1$

SOLVING WITH TWO TERMS IN THE NUMERATOR:

1) What is the solution of $\frac{x-7}{3} = -12$?
2) What is the solution of $6 = \frac{x-2}{4}$?
3) What is the solution of $7\frac{1}{2} = \frac{x+3}{2}$?

USING AN EQUATION AS A MODEL:

1) You are making a bulletin board to advertise community service opportunities in your town. You plan to use half a sheet of construction paper for each ad. You need 5 sheets of constructions paper for a title banner. You have 18 sheets of construction paper. How many ads can you make?

2) Two college friends rent an apartment. They have to pay the landlord two months' rent and a $500 security deposit when they sign the lease. The total amount they pay the landlord is $2800. What is the rent for one month?

Day 1

Name _____ Date _____

Worksheet - Solving Two Step Equations

$3a + 2 = 14$	$-7x + 4 = 25$	$10f - 5 = -15$
$-2m - ½ = 3\ ½$	$3y + .8 = 2$	$-4r + 11 = 15$
$1/3z + 9 = 14$	$2m/5 - 6 = -34$	$3/4n + 8 = 22$
$-12k - 3 = 69$	$-6h - 1.2 = 2.4$	$3y + 1.6 = 4$
$-5m - ¾ = 2\ 1/5$	$-10f - 5 = 15$	$2a + 2/3 = 8\ ¼$
$C/5 + 4 = -9$	$8y + 1.7 = 9.7$	$1/2a - 1 = 7$

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18.7 Solving Equations with More Than One Operation

Exercise 169

To solve equations with more than one operation, undo the addition or the subtraction first, and then undo the multiplication or the division.

Solve for a.

$5a - 7 = 28$

$5a - 7 + 7 = 28 + 7$

$5a = 35$

$\frac{5a}{5} = \frac{35}{5}$

$a = 7$

$5\ (7) - 7\ ?\ 28$

$35 - 7\ ?\ 28$

$28 = 28$ ✓

First, undo the addition or subtraction.

Then, undo the multiplication or division.

Check the solution.

$\frac{a}{6} + 2 = 6$

$\frac{a}{6} + 2 - 2 = 6 - 2$

$\frac{a}{6} = 4$

$6 \times \frac{a}{6} = 4 \times 6$

$a = 24$

$\frac{24}{6} + 2\ ?\ 6$

$4 + 2\ ?\ 6$

$6 = 6$ ✓

Solve each equation.

1. $2y - 9 = 1$

2. $4x + 5 = 45$

3. $3m - 2 = 16$

4. $3a + 5 = 38$

5. $2y - 8 = 12$

6. $4x - 8 = 0$

7. $5u - 12 = 18$

8. $\frac{n}{5} + 4 = 21$

9. $\frac{a}{6} + 7 = 35$

10. $\frac{x}{9} - 9 = 81$

11. $\frac{y}{10} - 10 = 100$

12. $\frac{w}{8} + 6 = 74$

CRITICAL THINKING

Use the equation $F = 1.8C + 32$ to answer each question below.

1. What is 100° Celsius (C) equal to in degrees Fahrenheit (F)?

2. What is 32° Fahrenheit (F) equal to in degrees Celsius (C)?

Solving Equations (continued)

REMEMBER

In a two-step problem, first get the x-term alone and then divide both sides of the equation by the number next to the x.

Examples:

$$\begin{array}{r} 3x-5 = 7 \\ +5 \quad +5 \\ \hline \frac{3x}{3} = \frac{12}{3} \end{array}$$

$$x = 4$$

$$\begin{array}{r} 6x + 3 = 21 \\ -3 \quad -3 \\ \hline \frac{6x}{6} = \frac{18}{6} \end{array}$$

$$x = 3$$

1. Solve for x:

$$3x - 2 = 13$$

2. Solve for x:

$$7x + 6 = 48$$

3. Solve for x:

$$8x - 9 = 63$$

4. Solve for x:

$$5x + 4 = -1$$

5. Solve for x:

$$20x - 40 = 80$$

6. Solve for x:

$$6x - 24 = 24$$

7. Solve for x:

$$60 = 5x + 25$$

8. Solve for x:

$$11x + 3 = 58$$

9. Solve for x:

$$16 = 2x - 14$$

10. Solve for x:

$$12x + 5 = 29$$

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2-2 Practice (continued) Form K

Solving Two-Step Equations

Solve each equation. Check your answer.

13. $\frac{f+4}{2}=5$

14. $\frac{p-6}{3}=-15$

15. $\frac{c+5}{-6}=-4$

16. $\frac{1}{4}z+9=-1$

17. $\frac{1}{2}=\frac{1}{2}t+3$

18. $4.52-5h=2.8$

19. Jasmine is 23 years old. Jasmine is 3 years less than half of George's age. Write and solve an equation to find George's age.

20. An appliance repair person charges \$55 per trip plus \$15 per hour for her labor. The cost of fixing a stove was \$92.50. Write and solve an equation to find how many hours it took to repair the stove.

21. Shelly has a cell phone plan that costs \$9.99 per month plus \$0.05 per minute. Her total bill for the month is \$25.59. Write and solve an equation to find how many minutes she used for the month.

22. **Writing** Describe using words how to solve the equation $3-5n=-22$. Describe the properties utilized in the solution.

Name Homework

11/13/18

Two-Step Equations

$4x + 3 = 11$ Step 1: Subtract _____ from each side. Step 2: Divide each side Solution: $x =$ _____	$6y - 1 = 5$ Step 1: Add _____ to each side. Step 2: Divide each side Solution: $y =$ _____
$2 + 5n = 12$ Step 1: Subtract _____ from each side. Step 2: Divide each side Solution: $n =$ _____	$3t - 1 = 8$ Step 1: Add _____ to each side. Step 2: Divide each side Solution: $t =$ _____

$7 = 2k + 1$ Step 1: Subtract _____ from each side. Step 2: Divide each side Solution: k = _____	$4r - 3 = 5$ Step 1: Add _____ to each side. Step 2: Divide each side Solution: r = _____
$11 = 4p - 5$ Step 1: Add _____ to each side. Step 2: Divide each side Solution: p = _____	$5x - 6 = 9$ Step 1: Add _____ to each side. Step 2: Divide each side Solution: x = _____

Math A Equations Review for quiz

Solve for the variable:

1. $x + 8 = -5$

2. $y - 4 = -7$

3. $2n = -10$

4. $\frac{y}{3} = 4$

5. $3 = n + 8$

6. $b - 2.3 = 4.8$

7. $\frac{p}{4} = -1.5$

8. $\frac{3}{2}x = 21$

9. $2x - 1 = 5$

10. $3x - 5 = 22$

11. $\frac{y}{5} + 2 = -6$

12. $\frac{x}{3} - 2 = 13$

13. $0.03x - 0.7 = 0.8$

14. $0.2x + 0.3 = 8.1$

15. $-2x + 7 = -13$

16. $32 = 3w + 5$