

# Solving Multi-Step Equations

## Agenda

Warm-Up

HW Check

Notes (p.13&14)

HW: Practice  
#1-12 EVENS

## Essential Question

What are the types of solutions to equations?

## Warm-Up (in notebook!!)

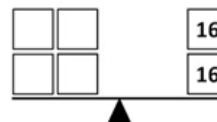
Glue the scales near the TOP of page 13. Title the page "Types of Solutions"

These scales are all currently balanced. You must choose a number to fill into the boxes in each problem that will keep them balanced. Whatever number you choose for a problem, you may ONLY use that number.

1.



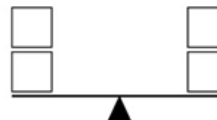
2.



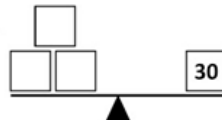
3.



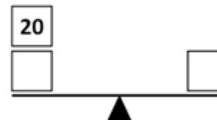
4.



5.



6.



# PICK FOUR from each section!

## So Much Trouble With Math?

Solve each equation or problem and find your solution in the answer column.  
Write the letter of the answer in each box that contains the exercise number.  
If the answer has a ●, shade in the box instead of writing a letter in it.

①  $8x + 15 = 3x - 20$

③  $18 - 5y = y + 4$

⑤  $11d = 81 - 16d$

⑦  $10b - 25 - 3b = 4b - 1$

⑨ The Sun Spa charges annual dues of \$125 plus \$10 per hour to use the facilities. The Moon Spa charges annual dues of \$230 plus \$7 per hour to use the facilities. For what number of hours would the two spas charge the same total amount?

⑩  $9(m - 2) = m + 40$

⑫  $5x + 2(11 - 4x) = 82 + x$

⑭  $7(7c + 1) - 4c = 13(3c - 2)$

⑯  $3q - 16q = 7 + 2(-8q - 3)$

⑰ Simon says: "Five times my age 4 years ago is the same as 3 times my age in 2 years." How old is Simon now?

②  $9n - 2 = 7n + 50$

④  $-7a - 10 = 20 - 3a$

⑥  $-22 - x = 5 + 6x + 9$

⑧  $33 + 15w = 3w - w + 4w$

⑪  $3(2p + 7) = 15(p - 4)$

⑬  $16 - 5(3t - 4) = 8(-2t + 11)$

⑮  $12(5 + 2y) = 4y - (6 - 9y)$

⑰  $14 - 3(5t - 12) = 1 - (20t + 1)$

Answers 1-9: A 8, I  $-7\frac{1}{2}$ , K 38, ●  $-5\frac{1}{7}$ , O -7, P  $-3\frac{2}{3}$ , T 3, E  $2\frac{1}{3}$ , D 35, C  $-4\frac{1}{4}$ , S 26, J 5

Answers 10-18: M 18, L  $-5\frac{1}{2}$ , N 13, G 9, R -10, B  $-7\frac{3}{4}$ , ● 52, W  $7\frac{1}{4}$ , F 12, H  $\frac{1}{3}$ , Y -15, U -6

5	16	3	12	6	7	14	10	7	12	2	13	17	1	15	18	9	6	5	16	4	18	11	2	13	15	8
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Equations and Problems:  
Solving Equations With the Variable on Both Sides

3.16

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$$\begin{aligned}
 16 - 5(3t - 4) &= 8(-2t + 11) \\
 16 - 15t + 20 &= -16t + 88 \\
 -15t + 36 &= -16t + 88 \\
 +16t \quad \quad +16t \\
 \hline
 t + 36 &= 88 \\
 -36 \quad \quad -36 \\
 \hline
 t &= 52
 \end{aligned}$$

# Solving Multi-Step Equations with Distribution

Glue the scales near the TOP of page 13.  
Title the page "Types of Solutions"

These scales are all currently balanced. You must choose a number to fill into the boxes in each problem that will keep them balanced. Whatever number you choose for a problem, you may ONLY use that number.



1.  $\frac{S}{\square} = \frac{S}{\square}$

2.  $\frac{\begin{matrix} 8 & 8 \\ 8 & 8 \end{matrix}}{\square} = \frac{16}{\square}$

3.  $\frac{20}{\square} = \frac{13}{\square}$

4.  $\frac{\begin{matrix} S & K \\ S & IS \end{matrix}}{\square} = \frac{\begin{matrix} S & IS \\ S & IS \end{matrix}}{\square}$

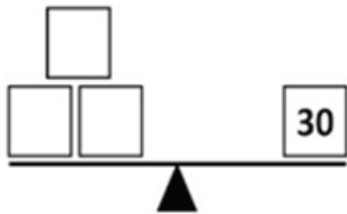
5.  $\frac{\begin{matrix} 10 \\ 10 & 10 \end{matrix}}{\square} = \frac{30}{\square}$

6.  $\frac{20}{\square} = \frac{\square}{\square}$

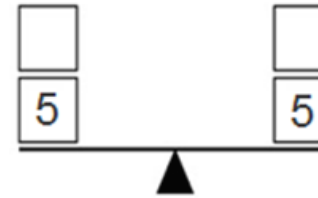
# Types of Solutions

Fold the page into thirds. Glue on the bottom of page 13!

ONE SOLUTION



INFINITE SOLUTIONS

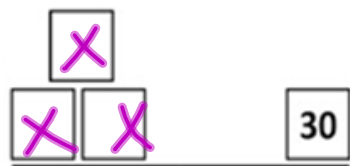


Types of  
Solutions  
to  
Equations

# Types of Solutions

Fold the page into thirds. Glue on the bottom of page 13!

## ONE SOLUTION



$$\frac{3x}{3} = \frac{30}{3}$$

$$x = 10$$

only ONE possible answer



## NO SOLUTIONS



$$\begin{array}{r} 20 + x \neq 13 + x \\ -x \quad \quad -x \\ \hline 20 \neq 13 \\ \text{FALSE} \end{array}$$

NO SOLUTION



## INFINITE SOLUTIONS



$$\begin{array}{r} x + 5 = x + 5 \\ -x \quad \quad -x \\ \hline 5 = 5 \checkmark \\ \text{TRUE} \end{array}$$

ALL REAL #s  
 $\mathbb{R}$





## Solving Multi-Step Equations p.14

$$1. \quad -3(2n - 5) = \frac{1}{2}(-12n + 30)$$

$$\begin{array}{r} -6n + 15 = -6n + 15 \\ +6n \quad \quad +6n \\ \hline 15 = 15 \checkmark \end{array}$$

All real #s

$$2. \quad 3y - 5 = y + 2y - 9$$

$$\begin{array}{r} 3y - 5 = 3y - 9 \\ -3y \quad \quad -3y \\ \hline -5 = -9 \end{array}$$

No solution

$$3. \quad \text{If } (x, 2) \text{ is a solution to } 2.1(7 - 3y) = x, \text{ what is the value of } x?$$

$x = 2$  (x, y)

$$2.1(7 - 3(2)) = x$$

$$2.1(7 - 6) = x$$

$$2.1(1) = x$$

2.1

$$4. \quad \text{If } (0, y) \text{ is a solution to } \frac{1}{3}(6y + 1) = \frac{2}{3}(3 - x), \text{ what is the value of } y?$$

$x = 0$

## Solving Multi-Step Equations p.14

5. Using the picture below to answer the following questions.



A. Write an equation in terms of  $a$  that could be used to solve for the perimeter of the square.

$4a+4$  add all sides

$$4(4a+4) = P$$

$$16a + 16 = P$$

B. If the perimeter of the square is 52 cm, solve for  $a$ .

$$16a + 16 = 52$$

$$\begin{array}{r} -16 \\ \hline 16a = 36 \end{array}$$

$$\frac{16a}{16} = \frac{36}{16} \div 4$$

$$a = \frac{9}{4} = 2.25$$

# Solving Multi-Step Equations p.14

7. Kieran wants to make an A in his algebra class. His averages for the first five 6 weeks are 94, 88, 92, 86, and 95. What does he need to make for the last six weeks in order to receive a 90 average overall?

$$\frac{94 + 88 + 92 + 86 + 95 + \overset{\text{last}}{\underset{\text{six weeks}}{\text{six weeks}}}}{6} = 90$$

8. The measures of the angles of a triangle are  $\angle A = x^\circ$ ,  $\angle B = (x + 5)^\circ$ ,  $\angle C = (2x + 3)^\circ$ . Solve for  $x$  and then find the measure of each angle.

$$\angle\text{'s in triangle} = \text{sum to } 180$$

9. A house painting company charges \$376 plus \$12 per hour. Another painting company charges \$280 plus \$15 per hour.

- A. How long is a job for which both companies will charge the same amount?
- B. What is the cost for completing the job in this amount of time?



Algebra I - Unit 1 - Solving Multi Step Equations Day 2

**Practice - Solving Multi Step Equations Day 2**

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

EVENS!!!!

**Solve each equation and check your answer. Be sure to show all work**

1.  $6x + 7 = 8x - 13$

2.  $2(5n - 2) = 4(n + 2)$

3.  $4(2a - 8) = \frac{1}{7}(49a + 70)$

4.  $x + 4 = \frac{-3x - 7}{2}$

5.  $-x + 3 = -\frac{4}{7}x$

6.  $28 - 2.2y = 11.6y + 262.6$

7.  $-8 - 3x = x - 4(2 + x)$

8.  $6(y + 2) - 4 = 6y$

Algebra I - Unit 1 - Solving Multi Step Equations Day 2

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**Define a variable, set up an equation, then solve. Write your answer in a complete sentence.**

9. Two less than 2 times a number is 64 plus the same number. Find the number.

10. Twice the greater of two consecutive odd integers is 13 less than three times the lesser. Find the integers.

11. A moving company charges \$800 plus \$16 per hour. Another moving company charges \$720 plus \$21 per hour.

How long is a job that costs the same no matter which company they use?

12. The measure of an angle is  $75^\circ$  more than its supplement. Find the measure of each angle.

# Solving Multi-Step Equations

1.  $10 = x$

2.  $n = 2$

3.  $a = 42$

4.  $x = -3$

5.  $7 = x$

6.  $-17 = y$

7. All Real #s

8. No Solution

9.  $2x - 2 = 64 + x$

$x = 66$

10.  $2(x + 2) = 3x - 13$

Solve for x!

11.  $800 + 16x = 720 + 21x$

16 hours

12.  $x + x + 75 = 180$

The smaller angle is  $52.5^\circ$ . What is the measure of the larger angle?

Your assignment is the EVENS! Try the odds for more practice (& a bonus stamp!)

