Lesson Objective: Solve multi-step equations. Check solutions by substituting values into original equations.

Vocabulary Box

constant – A value that does not change. Examples: 4, $-6\frac{2}{3}$, and π.

combining like terms – Adding or subtracting two or more terms that contain exactly the same variable, or adding or subtracting two or more constant terms. Examples: $5x + 3x = 8x$, and $(2w - 7) + (w - 4) = 3w - 11$, but $4m + 5n$ cannot be simplified because the two terms are not like terms.

Independent Practice

Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Solve each equation. Show your work. Check your answers.

1. $-12r - (-66) = -102$

2. $9y + 8y + 7 = 200 - 23$

3. $76 = 7u + 113$

4. $4\frac{2}{3}p - 1\frac{1}{2} = 7\frac{5}{6}$

5. $\dfrac{a}{-2} - \dfrac{2}{3} = \dfrac{8}{9} - \dfrac{1}{3}$

6. 31 + 8d + d – 12 = 17 + 38

7. 8 – (–8) = 4 + 4f

BONUS?

<u>Directions</u>: Solve each equation. Show your work. Check your answers.

1. $\dfrac{h}{4} + \dfrac{h}{5} = 6$

2. $\dfrac{2j}{5} = \dfrac{4}{9} - \dfrac{1}{9} \div \dfrac{2}{5}$

Problem Solving

For each of the following problems, write an equation to model the situation. Solve the equation. Then answer the problem, and check your answer to be sure that it makes sense.

1. Juliana bought 3 books, each for the same price. She gave the cashier a coupon for $5 off her total purchase. She paid $28 total, not including tax. What was the cost of each book?

2. Joaquin sold 18 tickets. This was 2 less than 4 times the number Ricky sold. How many did Ricky sell?

3. Pam is 7 years more than half her sister's age. If Pam is 17, how old is her sister?

4. Jason's $27 paycheck was $3 less than twice Lucas' paycheck. How much did Lucas earn?

5. Jim's house is 3 miles farther from school than K.D.'s house. If Jim's house is 12 miles from school, how far is K.D.'s house from school?

6. Nine more than 2 times a number is 11. What is the number?

7. Nancy's age is 4 years more than her mother's age divided by 6. If Nancy is 9, how old is her mother?

Directions: Solve each equation. Show your work. Check your answers.

1. $7m + 31 = 10$

2. $-8n + (-42) - 2n = -22 - (-50)$

3. $1\frac{1}{2}v - 4\frac{1}{6} = 6\frac{2}{3}$

Lesson Objective: Solve equations with variables on both sides, and justify the steps for solving them using appropriate properties.

Vocabulary Box

additive inverse – For any number x, the number that gives a sum of 0 when added to x. Example: the additive inverse of 5 is –5.

multiplicative inverse – The reciprocal of a number. Example: the multiplicative inverse of 5 is $\frac{1}{5}$.

multiplicative identity – The number 1, because multiplying 1 times any number gives that number. Example: $5 \bullet 1 = 5$.

distributive property – $a(b + c) = ab + ac$. Example: $5(6 + 7) = 5(6) + 5(7)$.

associative property of addition – $(a + b) + c = a + (b + c)$. Example: $(5 + 6) + 7 = 5 + (6 + 7)$.

commutative property of addition – $a + b = b + a$. Example: $5 + 6 = 6 + 5$.

Complete the following practice problems with your partner. Then your teacher will review the answers. Make sure that you show all important work.

Directions: Solve each equation. Show your work. Check your answers.

    1. $-8w + 140 = 12w$

    2. $5c - 21 = c - 37$

    3. $9r + 24 - 11r = 4(3 - r)$

Summary/Closure

A. Vocabulary Words

<u>Directions</u>: Match each vocabulary term with its example.

1. additive inverse

    a. $-\dfrac{7}{3}$ and $\dfrac{7}{3}$

2. associative property of addition

    b. $\dfrac{1}{8}$ and 8

3. commutative property of addition

    c. $1 \bullet \dfrac{3}{2} = \dfrac{3}{2}$

4. distributive property of addition

    d. 5(2 + 9) = 5(2) + 5(9)

5. multiplicative identity

    e. 5 + (2 + 9) = (5 + 2) + 9

6. multiplicative inverse

    f. 6 + 0 = 0 + 6

B. Summarize What We Learned Today

<u>Directions</u>: Write three sample problems like the ones that we studied today. You will use this explanation as a reference.

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Independent Practice

Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Solve each equation. Show your work. Check your answers.

1. $16d + 29 = 12d + 93$

2. $2f = 8f - 54$

3. −5h + 8 + 13 = h + 14 + h

4. −2(5k + 4) = −6(2k − 7)

5. 9(m − 4) − 4m = 14 + 5(2m + 3)

6. $\dfrac{2}{3}n + \dfrac{1}{4} = \dfrac{5}{6}n + \dfrac{5}{4}$

BONUS?

Directions: Solve each equation. Show your work. Check your answers.

1. −(3 − p) − (2p + 5) = p

2. 6[2r + 7(3r − 4)] = 0

**Problem
Solving**

The Answer Is 42

The 8 halves of 4 equations have been scrambled and are listed below. When you match 2 correct halves together, put an equal sign between them, and correctly solve the resulting equation, the solution will be 42.

$-71 + 2x + 32$

$-\dfrac{19}{3}x$

$-x + 3 + 2x$

$2x - 224$

$3(x - 32) + 180$

$4(7 - x)$

$5x$

$7(4 - x)$

What I Know

Directions: Solve each equation. Show your work. Check your answers.

1. $7z - 84 = 4z - 33$

2. $-5y = 4(\frac{1}{2}y + \frac{21}{2})$

3. $3(7z - 12) - 11z = -2(z - 5) - 22$