

Name: _____ Class: _____

Intermediate II

Equations in One Variable (Chapter 2)

Note: All homework assignments are worth 10 points unless otherwise stated, and are due the next class day. No credit will be given for anything turned in after the test.

Date	Objective	Assign. #	Assignments	HW Checked
	<i>8.EE.7a, b</i> Solve equations with rational coefficients	2.1	p. 115-118 (1-12, 15-18, 20-30 evens)	
	<i>8.EE.7a, b</i> Solve two-step equations	2.2	p. 125-128 (1-13, 16, 28-36)	
	<i>8.EE.7a, b</i> Write two-step equations	2.3	p. 133-136 (1-13, 21-28)	
	Ch. 2 Quiz			
	<i>8.EE.7a, b</i> Solve equations with variables on each side	2.4	p. 149-152 (1-13, 22-32)	
	<i>8.EE.7a, b</i> Solve multi-step equations	2.5	p. 157-160 (1-14, 24-31)	
	Review	2.R	Worksheet 2.R: Equations Review	
	Equations in One Variable Test (Ch. 2)			

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Rational Coefficients | Ch 2 Lesson 1

Definition|

Rational: A number that is expressing a _____ of whole numbers, or a fraction

Coefficient: The number before and _____ the variable

Ex: The coefficients of $2x$, $.5y$, $7z$, and $16a$ are 2, .5, 7, and 16 respectively

There are two ways that we can “undo” a multiplication problem.

Discuss the ways with your group members, and write below:

Way 1: _____

Way 2: _____

Multiplicative Inverses: _____

example:

A. Complete the following problems individually.

Find the **multiplicative inverse** of the following numbers:

1. 2

5. $\frac{1}{3}$

2. -5

6. $\frac{4}{5}$

3. 4

7. $-\frac{3}{7}$

4. 17

When finding the multiplicative inverse for a rational number (fraction), you are finding the: _____.

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Rational Coefficients | Ch 2 Lesson 1

The coolest part about multiplicative inverses, or _____, is they help you undo multiplication by a rational number without having to divide the fraction.

B. Let's practice solving for variables with rational coefficients!

ex: $\frac{3}{4}c = 18$

Now practice in your group:

1. $\frac{1}{5}x = 12$

4. $-24 = -\frac{6}{7}p$

2. $-\frac{2}{9}d = 4$

5. $20 = -\frac{5}{3}p$

3. $15 = \frac{5}{3}n$

6. $27 = \frac{3}{8}p$

C. Sometimes, you'll be given mixed numbers instead of improper fractions. We'll have to convert.

Example: $1\frac{1}{2}s = 16\frac{1}{2}$

First, convert the mixed numbers to improper fractions:

Then find the multiplicative inverse OF THE COEFFICIENT and solve:

Practice with group members:

1. $4\frac{1}{6} = 3\frac{1}{3}c$

2. $-9\frac{5}{8}w = 108$

3. $1\frac{7}{8}y = 4\frac{1}{2}$

4. $2\frac{2}{5} = \frac{5}{6}d$

5. $4\frac{5}{6}x = 8\frac{3}{10}$

6. $2\frac{7}{8} = \frac{23}{7}x$

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Rational Coefficients | Ch 2 Lesson 1

D. Rational numbers are numbers that CAN be represented as fractions.

What is another way to write the number $\frac{1}{2}$? _____

When your coefficient is represented in decimal form, you can undo the multiplication by _____.

Example: $0.3x = 1.35$

Now, Practice!

1. $6.4 = 1.6y$

4. $-7.56 = 1.26m$

2. $-2.3f = 9.2$

5. $-0.54 = 0.36m$

3. $-8h = -0.36$

6. $2.5c = 15.75$

Good job! Now see if you can take it a step further...

Solve the following equations. Show all work (even if you can do it in your head).

1. $15 = 5m$

4. $x - 13 = 12$

2. $4 + x = 16$

5. $\frac{x}{6} = 4$

3. $0.3k = 18$

6. $\frac{a}{3} = 7$

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Solving Two-Step Equations | Ch 2 Lesson 2

To solve equations, you can “undo” the operations to find the variable by itself. A property is a statement that is true for any number. Find the **Properties of Equality** by answering the following questions.

Which property undoes **addition**? _____

Example:

Which property undoes **division**? _____

Example:

Which property undoes **multiplication**? _____

Example:

Which property undoes **subtraction**? _____

Example:

Solve the following one-step equations like the examples above.

Show all work:

1. $9 = 3m$

4. $x - 12 = 11$

2. $6 + x = 15$

5. $\frac{x}{10} = 9$

3. $4k = 32$

6. $\frac{a}{7} = 5$

What is the value of x ?

$$21 + x = 21$$

The answer you found is called the *Additive Identity*. This means that whenever you **add** it to any number, the value will not change.

So, the Additive Identity is _____.

What is the value of x ?

$$2x = 2$$

The answer you found is called the *Multiplicative Identity*. This means that whenever you **multiply** it by any number, the value will not change.

So, the Multiplicative Identity is _____.

Looking back at the problems we have already solved, determine which identity property we used (either additive or multiplicative). Once you have done this, explain WHY your answer is correct in words.

1. $9 = 3m$

2. $6 + x = 15$

3. $4k = 32$

4. $x - 12 = 11$

5. $\frac{x}{10} = 9$

6. $\frac{a}{7} = 5$

You can combine the properties of equality to solve two-step equations.

Solve the following equations by using the properties of equality as well as the identity properties. Remember, you are working BACKWARDS.

Example: $2x + 3 = 7$

Notes:

1. $3x + 2 = 20$

5. $\frac{4}{5}x + 4 = 24$

2. $5 + 2n = -1$

6. $1.6y - 5 = 1.4$

3. $6 - 3x = 21$

7. $-8 + 4k = -16$

4. $-19 = -3x + 2$

8. $-5 = 3m - 14$

Writing Two-Step Equations | Ch 2 Lesson 3

Solve the following two-step equations:

1. $2h + 9 = 21$

2. $4(x - 2) = 12$

3. $-\frac{2}{3}m - 4 = 10$

Each of the equations above is a mathematical sentence.

If x represents a number, what expression can you write for three times a number?

If x represents a number, what expression can you write for three times that number, increased by five?

What is the math symbol for the verb "is" ?

What equation can you write for the sentence, "Three times a number, increased by five, is thirteen"?

Name three words that indicate an addition statement:

Name three words that indicate a subtraction statement:

How would you represent "one-half of a number"?

How would you represent "twice a number"?

Write problems 1-3 above as sentences:

1. _____

2. _____

3. _____

Writing Two-Step Equations | Ch 2 Lesson 3

Define a variable. Then translate each sentence into an equation. Then find each number.

1. Two more than four times a number is -10.
2. The difference between three times a number and eight is -14.
3. Three more than the quotient of a number and 2 is 7.
4. The difference between twice a number and 4 is 16.

Solve the following equations:

4. $4 = \frac{1}{15}v$

5. $169 = 1.3b$

6. $4\frac{1}{4}s = 10\frac{5}{8}$

7. $5 + 2y = 21$

8. Cassidy wants to buy a new smart phone. Her parents tell her they will pay for her minutes and texts, but that she needs to pay for the phone and data plan. A two-year contract under these terms is \$799. The phone costs \$199 with the two-year contract. Define a variable. Then write and solve an equation to find out **how much the data plan costs per month**.

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Solve Equations with Variables on Each Side | Ch 2 Lesson 4

Variables can be on both sides. To solve these equations, we “combine like terms”. After all like terms are combined, you solve the equation like a normal two-step equation.

Solve each equation. Check your solution.

1. $3w + 6 = 4w$

2. $a + 18 = 7a$

3. $8c = 5c + 21$

4. $11d + 10 = 6d$

5. $2e = 4e - 16$

6. $7v = 2v - 20$

7. $4n - 6 = 10n$

8. $2y + 27 = 5y$

9. $8h = 6h - 14$

10. $18 - 2g = 4g$

11. $4x - 9 = 6x - 13$

12. $5c - 15 = 2c + 6$

13. $t + 10 = 7t - 14$

14. $8z + 6 = 7z + 4$

Solve Equations with Variables on Each Side | Ch 2 Lesson 4

15. $2e - 12 = 7e + 8$

16. $9k + 6 = 8k + 13$

17. $2d + 10 = 6d - 10$

18. $-2a - 9 = 6a + 15$

19. $3y + 5.2 = 2 - 5y$

20. $10b - 2 = 7b - 7.4$

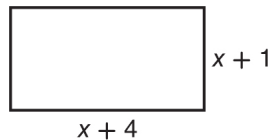
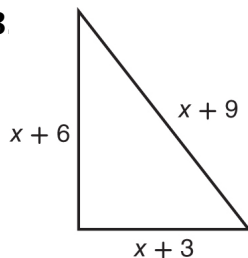
Define a variable, write an equation, and solve to find each number.

21. Fourteen less than five times a number is three times the number.

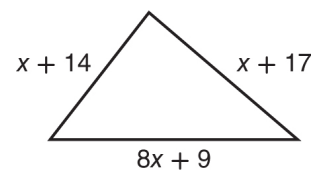
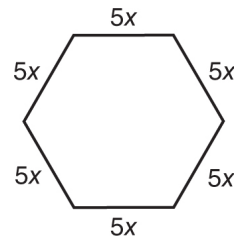
22. Twelve more than seven times a number equals the number less six.

Write an equation to find the value of x so that each pair of polygons has the same perimeter. Then solve.

23.



24.



Write and solve an equation to solve each exercise.

25. **GOLF** For an annual membership fee of \$500, Mr. Bailey can join a country club that would allow him to play a round of golf for \$35. Without the membership, the country club charges \$55 for each round of golf. How many rounds of golf would Mr. Bailey have to play for the cost to be the same with and without a membership?

26. **MUSIC** Marc has 45 CDs in his collection, and Corinna has 61. If Marc buys 4 new CDs each month and Corinna buys 2 new CDs each month, after how many months will Marc and Corinna have the same number of CDs?

Solve Multi-Step Equations – Page 2

The distributive property can be used to aid in solving problems. Remember that you are truly distributing the multiplication.

Solve each equation. Check your solution.

1. $4(2 + 3c) = 56$

2. $63 = -3(1 - 2n)$

3. $-29 = 5(2a - 1) + 2a$

4. $-g + 2(3 + g) = -4(g + 1)$

5. $7p - (3p + 4) = -2(2p - 1) + 10$

6. $-3(t + 5) + (4t + 2) = 8$

7. Currently, 96 members participate in the morning workout, and this number has been increasing by 2 people per week. Currently, 80 members participate in the afternoon workout, and this number has been decreasing by 3 people per week. In how many weeks will the number of people working out in the morning be double the number of people working out in the afternoon?

8. Two cyclists leave town at the same time on the same road going in the same direction. Cyclist *A* is going 6 miles per hour faster than cyclist *B*. After 8 hours, cyclist *A* has traveled three times the distance as cyclist *B*. Use the equation $24x = 8(x + 6)$ to find how fast cyclist *B* is traveling.

Solve Multi-Step Equations | Ch 2 Lesson 5

Solve each equation. Check your solution.

1. $9m + 14 = 2m$

2. $13x = 32 + 5x$

3. $8d - 25 = 3d$

4. $t - 27 = 4t$

5. $7p - 5 = 6p + 8$

6. $11z - 5 = 9z + 7$

Define a variable. Then write and solve an equation to solve each problem.

7. Ishi bought a canvas and 8 tubes of paint for \$24.95. If the canvas cost \$6.95, how much did each tube of paint cost?

8. Three consecutive integers can be represented by n , $n + 1$, and $n + 2$. If the sum of three consecutive integers is 57, what are the integers?

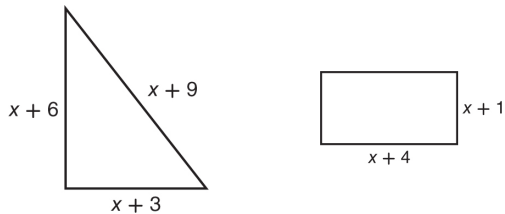
Write an equation for each problem.

9. Fourteen less than five times a number is three times the number.

10. Twelve more than seven times a number equals the number less six.

Write an equation to find the value of x so that each pair of polygons has the same perimeter. Then solve.

11.



Write and solve an equation to solve each exercise.

12. For an annual membership fee of \$500, Mr. Schoonover can join a health club that would allow him to play a game of racquetball for \$35. Without the membership, the health club charges \$55 for each game. How many games would Mr. Schoonover have to play for the cost to be the same with and without a membership?

13. Marc has 45 CDs in his collection, and Corinna has 61. If Marc buys 4 new CDs each month and Corinna buys 2 new CDs each month, after how many months will Marc and Corinna have the same number of CDs?