

Algebra 1 Chapter 3 Notes Solving Linear Equations

3.1 Solving Equations Using Addition & Subtraction

Inverse Operations:

Transformations that Produce Equivalent Equations:

Add the same number to both sides

Subtract the same number from both sides

Simplify one or both sides

Interchange the sides (Reflexive property)

Examples

Practice Problems

1. $x - 7 = -15$

2. $n - (-6) = 4$

3. $-7 = 10 + y$

4. $5 - (-z) = 21$

5. $m - |-3| = 14$

6. $-8 = -b + (-2)$

3.2 Solving Equations Using Multiplication & Division

Transformations that Produce Equivalent Equations

Multiply each side of the equation by the same nonzero number

Divide each side of the equation by the same non-zero number.

Properties of Equality

Addition Property of Equality: If $a=b$ then

Subtraction Property of Equality: If $a=b$ then

Multiplication Property of Equality: If $a=b$ then

Division Property of Equality: If $a=b$ and then

Using Ratios to Solve

Ratio of a to b—

Examples

Practice Problems

Solve the equation.

1. $4 = 11m$

2. $\frac{y}{-6} = -15$

3. A movie runs through 24 frames per second. How many frames in a 90 minute movie?

3.3 Solving Multi-Step Equations

1. Distribute/Clear Fractions
2. Combine Like Terms
3. Use Add/Sub to isolate the term with the variable
4. Use Mult/Div to solve for the variable

Examples

Practice Problems

Solve

1. $7x - 3x - 8 = 24$

2. $5x + 3(x + 4) = 28$

3. $4x - 3(x - 2) = 21$

4. $66 = -\frac{6}{5}(x + 3)$

3.4 Solving Equations with Variables on Both Sides

1. Distribute
2. Combine like terms on each side
3. Move x terms to the left side of the equal sign
4. Move constant terms to the right side of the equal sign
5. Mult/Div. to solve for x

Special Cases:

If all the variables drop out and you are left with a
True statement, your solution will be all real numbers.
False statement, you will have no solution.

Examples

Practice

1. $-2n = 3n + 17$

2. $15a - 2(4a + 5) = -6a$

3. $\frac{1}{4}(12 - 16q) = 5(q + 6)$

4. $-6(4 - 2x) = 12 - 24$

3.5 Linear Equations & Problem Solving

1. Draw a diagram (if possible)
2. Write a verbal model
3. Assign Labels
4. Write the Algebraic Model
5. Solve
6. Answer in a complete sentence

Practice

1. You have 78 ft of fencing to enclose a rectangular pen for your rabbit. To provide sufficient space for the rabbit to exercise, the pen is to be twice as long as it is wide. Find the dimensions of the pen.

2. You and your brother are painting a room. You are painting at a rate of 12 square feet per minute and your brother is painting at a rate of 16 square feet per minute. When your brother started painting, you had already painted 40 square feet. In how many minutes will you and your brother have painted the same amount?

3.6 Solving Decimal Equations

Round to the nearest

Tenth means _____ decimal places.

Hundredth means _____ decimal places.

Practice

Solve & round to the nearest hundredth

1. $23 - 6y = 7$

2. $6.26x - 54.89 = 0.86x + 9.76$

Solve & round to the nearest tenth.

3. $3.7 - 8.4x = 1.2x + 35.9$

4. $7.2x + 1.3 = 3.8 + 4.2x$

3.7 Formulas & Functions

Examples

Practice

Re-write the equation so that y is a function of x .

1. $16x + y = -11$

2. $9 - y = 3x$

3.8 Rates, Ratios, and Percents

Rate of a per b —

Unit rate—

Examples

Practice

1. A amusement park is open 330 days per year and received 3,600,000 visitors. Find the number of visitors per day. Round your answer to the nearest whole number.

2. You want to exchange \$250 for Canadian dollars. The rate of currency exchange is 1.48 Canadian dollars per United States Dollar. How many Canadian dollars will you receive?