

Warm Up

$$-x^2 + 5xy - 3 \text{ when } x = 2 \text{ and } y = -3$$

$$\begin{array}{r} -(2)^2 + 5(2)(-3) - 3 = -37 \\ -4 - 30 - 3 \end{array}$$

$$2x^2 - y^2 \text{ when } x = 4 \text{ and } y = 3$$

$$\begin{array}{r} 2(16) - 9 \\ 32 - 9 = 23 \end{array}$$

Section 6.2 Linear Equations

$$4x - 3y = 5$$

1. Term
2. Coefficient
3. Like terms and unlike terms
4. Simplify expressions - combine like terms
5. Distributive property $a(b + c) = ab + ac$

Example: Simplify

$$\begin{array}{c} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \\ -2x + 4 - 6y - 11 - 5y + 3x \\ \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \\ x - 11y - 7 \end{array}$$

$$\begin{array}{c} 6y - 3(3y - 1) - 2y + 3 \\ 6y - 9y + 3 - 2y + 3 \\ -5y + 6 \end{array}$$

Solving linear equations - Isolate the variable

1. Addition Property

$$\begin{array}{r} x - 4 = 2 \\ +4 \quad +4 \\ \hline x = 6 \end{array}$$

2. Subtraction Property

3. Multiplication Property

4. Division Property

Rules for Solving a Linear Equation

1. If the equation contains fractions, multiply both sides of the equation by the lowest common denominator. This step will eliminate all fractions.
2. Use the distributive property to remove parentheses when necessary.
3. Combine like terms on the same side of the equal sign when possible.
4. Use the addition or subtraction property to collect all terms with a variable on one side of the equal sign and all constants on the other side of the equal sign.
5. Solve for the variable using the division or multiplication property.

Solve each equation

$$4 = 5 + 2(x + 1)$$

$$4 = 5 + 2x + 2$$

$$4 = 7 + 2x$$

$$-7 \quad -7$$

$$-\frac{3}{2} = \frac{2}{2}x \quad x = -\frac{3}{2}$$

$$\frac{2}{3}x + \frac{1}{3} = \frac{3}{4}$$

$$8x + 4 = 9$$

$$8x = 5$$

$$x = \frac{5}{8}$$

$$\cancel{30} \cdot \frac{2}{5} x + \frac{\cancel{10} \cdot 1}{2} (4x - 3) = -\frac{1}{2} \cdot \cancel{30}^{15}$$

$$12x + 10(4x - 3) = -15$$

$$12x + 40x - 30 = -15$$

5

$$\frac{1}{3} x$$

$$\cancel{32} \cdot \frac{3}{4} (-3x - 2) - \frac{\cancel{4} \cdot 2}{2} = -7 \cdot 12$$

$$9(-3x - 2) - 8 = -84$$

$$-27x - 18 - 8 = -84$$

$$-27x - 26 = -84$$

$$\frac{-27x}{-27} = \frac{-58}{-27}$$

$$6x + 8 = 10x + 12$$

$$4x - 0.48 = 0.8x + 4$$

$$12 = 2(3x - 4) - 4x$$

$$3(x - 4) + x + 2 = 6x - 2(x + 3)$$

$$3x - 12 + x + 2 = 6x - 2x - 6$$

$$4x - 10 = 4x - 6$$

$$-10 \neq -6$$

NO SOLUTION

$$2(x + 4) - 3(x - 5) = -x + 23$$

$$2x + 8 - 3x + 15 = -x + 23$$

$$-x + 23 = -x + 23$$

ALL R
 ∞ solution
 BUZZ

Ratio: a quotient of two quantities

$$2:5 \quad 2 \text{ to } 5 \quad \frac{2}{5}$$

Proportion is two equal ratios:
To solve a proportion, cross multiply.

$$\frac{x+2}{5} = \frac{x+5}{8}$$
$$8(x+2) = 5(x+5)$$
$$8x+16 = 5x+25$$
$$3x = 9$$
$$x = 3$$

Application problems using proportions

1. Represent the unknown quantity by a variable.
2. Set up the proportion by listing the given ratio on the left hand side of the equal sign and the unknown and other give quantity on the right had side of the equal sign. When setting up the right hand side of the proportion, the same respective quantities should occupy the same respective positions on the left and right. For example:

$$\frac{\textit{miles}}{\textit{hour}} = \frac{\textit{miles}}{\textit{hour}}$$

3. Drop the units and cross multiple.

Example 14 Page 326

The cost for water in Orange County is \$1.64 per 750 gallons of water used. What is the water bill if 30,000 gallons are used?

$$\frac{\$ 1.64}{\text{gal } 750} = \frac{\$ x}{\text{gal } 30000}$$

$$x = \$63.60$$

1x
x

Example 15 Page 327

Insulin comes in 10 cubic centimeter (cc) vials labeled in the number of units of insulin per cubic centimeter of fluid. A vial of insulin marked U40 has 40 units of insulin per cubic centimeter of fluid. If a patient needs 30 units of insulin, how much fluid should be drawn into the syringe from the U40 vial?

$$\frac{40}{1} = \frac{30}{x}$$

$$40x = 30$$

$$x = \frac{3}{4}$$

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