KEY CONCEPT OVERVIEW

In this topic, students apply their knowledge of solving equations to real-world situations. Using knowledge of angle relationships (e.g., a right angle has a measure of 90 degrees, and a straight angle has a measure of 180 degrees), students write and solve one-step equations to find the unknown measure of an angle. Given a real-world situation, students write an equation with two variables (e.g., \( t = 7m \)), analyze the relationship between the independent and dependent variables, create a table, and plot the points on the coordinate plane. To wrap up the module, students use their understanding of true and false number sentences to write and graph inequalities on a number line diagram.

SAMPLE PROBLEMS (From Lessons 30 and 32)

1. Write an equation that represents the following situation and solve.

\( \angle ABC \) measures 90°. It has been split into two angles, \( \angle ABD \) and \( \angle DBC \). The measures of the two angles are in a ratio of 2:1. What is the measure of each angle?

Let \( x^\circ \) represent the measure of \( \angle DBC \).

\[
\begin{align*}
    x^\circ + 2x^\circ &= 90^\circ \\
    3x^\circ &= 90^\circ \\
    3x^\circ ÷ 3 &= 90^\circ ÷ 3 \\
    x^\circ &= 30^\circ
\end{align*}
\]

The smaller angle (\( \angle DBC \)) measures 30°. Since the ratio of angle measures is 2:1, the measure of the larger angle (\( \angle ABD \)) has a value of 60° because \( 30 × 2 = 60 \).

2. Each week, Quentin saves $30. Write an equation that represents the relationship between the number of weeks that Quentin has saved his money, \( w \), and the total amount of money in dollars he has saved, \( s \). Then, name the independent and dependent variables. Create a table and a graph that show the total amount of money Quentin has saved from week 1 through week 8. Finally, write a sentence that explains this relationship.

\( s = 30w \)

The amount of money saved in dollars, \( s \), is the dependent variable, and the number of weeks, \( w \), is the independent variable.
SAMPLE PROBLEM  (continued)

**Dependent variable:** A variable whose value depends on the value of another variable. For example, if \( x \) represents the number of hours spent studying and \( y \) represents the test score, the value of \( y \) might change according to the value of \( x \).

**Independent variable:** A variable (e.g., age) whose value is not affected by the values of other variables.

**Graphing Inequalities**

Therefore, the amount of money Quentin has saved increases by $30 for every week he saves money.

Additional sample problems with detailed answer steps are found in the Eureka Math Homework Helpers books. Learn more at GreatMinds.org.

**HOW YOU CAN HELP AT HOME**

You can help at home in many ways. Here are some tips to help you get started.

- Encourage your child to identify which number(s) make each inequality true. Given the set of numbers \( \{3, 4, 9, 12, 24\} \), choose the number(s) that make each inequality true.
  
  a. \( m + 7 < 12 \) (solution: \( \{3, 4\} \))
  
  b. \( t - 2 \leq 9 \) (solution: \( \{3, 4, 9\} \))
  
  c. \( \frac{k}{3} \geq 2.25 \) (solution: \( \{9, 12, 24\} \))

- With your child, write three equations that have a solution of \( x = 12 \). (Possible equations: \( 24 = 2x \), \( 8 = x - 4 \), and \( 18 = x + 6 \).) Then, each of you create an equation for which the solution is a positive whole number between 50 and 100. Exchange equations with your child. Solve each other’s equations, and explain why the solution is correct.

**TERMS**

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**Independent variable:** A variable (e.g., age) whose value is not affected by the values of other variables.

**MODELS**

**Graphing Inequalities**