

67 homework constant of proportionality answer key

6.7 Homework: Constant of Proportionality - Answer Key

Structure:

This document provides a comprehensive answer key for the homework assignment related to the concept of "Constant of Proportionality" in a sixth or seventh-grade mathematics curriculum (assumed, based on the title). The structure is organized by problem number, mirroring the order of the original homework assignment. Each problem features:

1. **Problem Restatement:** A clear restatement of the original problem to ensure clarity and context.
2. **Solution Steps:** A detailed, step-by-step solution illustrating the method used to arrive at the answer. This includes explanations of any formulas used and rationale behind each step. Emphasis is placed on showcasing the underlying mathematical concepts.
3. **Answer:** The final numerical answer, clearly highlighted.
4. **Verification (where applicable):** Checks to ensure the solution's correctness, using alternative methods or verifying that the answer satisfies the conditions of the problem.
5. **Common Mistakes:** Identifies potential pitfalls students may encounter when solving similar problems and offers strategies to avoid these errors.

Description:

This answer key serves as a valuable resource for students to check their understanding of the constant of proportionality and to identify areas where they may need further assistance. It's designed not just to provide answers, but to guide students through the problem-solving process, fostering a deeper understanding of the mathematical principles involved. It covers a range of problem types related to identifying, calculating, and applying the constant of proportionality in various contexts, such as tables, graphs, and real-world scenarios. The detailed explanations promote self-learning and facilitate independent review.

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Keywords: Constant of proportionality, direct proportion, proportional relationships, ratios, rates, unit rate, sixth grade math, seventh grade math, answer key, homework solutions, mathematics, algebra.

Summary:

This 1000-word answer key thoroughly explains the solutions to a sixth or seventh-grade mathematics homework assignment focusing on the constant of proportionality. Each problem is addressed with detailed step-by-step solutions, including problem restatements, explanations of methods, final answers, verification steps (where applicable), and notes on common errors. The key aims to support student learning by providing not only answers but also a comprehensive guide to understanding the underlying mathematical principles related to proportional relationships. It serves as a valuable tool for self-checking, identifying areas needing improvement, and reinforcing conceptual understanding.

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(The following section would contain the actual answers to the homework problems. Since the homework problems are not provided, I will create example problems and solutions to illustrate the structure. This section would comprise the bulk of the 1000 words.)

Example Problems and Solutions:

Problem 1:

Problem Restatement: A recipe calls for 2 cups of flour for every 3 cups of sugar. What is the constant of proportionality between flour and sugar?

Solution Steps: The constant of proportionality is the ratio of flour to sugar. This is given as 2 cups of flour / 3 cups of sugar. To simplify, we can express this as a fraction: $\frac{2}{3}$.

Answer: $\frac{2}{3}$

Verification: We can check this by multiplying the constant of proportionality by the amount of sugar to find the corresponding amount of flour. For example, if we use 6 cups of sugar, we expect $6 \left(\frac{2}{3}\right) = 4$ cups of flour, which is consistent with the recipe's ratio.

Problem 2:

Problem Restatement: The graph shows a proportional relationship between distance (in miles) and time (in hours). The points (2, 60) and (4, 120) lie on the graph. Find the constant of proportionality.

Solution Steps: The constant of proportionality represents the rate, in this case miles per hour. We can calculate this using the coordinates of any point on the graph. Using (2, 60), the rate is 60 miles / 2 hours = 30 miles/hour. Similarly, using (4, 120), the rate is 120 miles / 4 hours = 30 miles/hour. Both points give the same rate.

Answer: 30 miles/hour

Verification: The constant of proportionality should be consistent across all points on the graph.

Problem 3:

Problem Restatement: A table shows the number of apples and the cost. Apples: 2, 4, 6; Cost: \$1.50, \$3.00, \$4.50. Is there a constant of proportionality? If so, what is it?

Solution Steps: We calculate the ratio of cost to apples for each row: $\$1.50/2$ apples = $\$0.75/\text{apple}$; $\$3.00/4$ apples = $\$0.75/\text{apple}$; $\$4.50/6$ apples = $\$0.75/\text{apple}$. Since the ratio is consistent, there is a constant of proportionality.

Answer: $\$0.75/\text{apple}$

Common Mistakes: Students may incorrectly calculate the ratio or fail to recognize that a consistent ratio indicates a constant of proportionality.

(This section would continue with more example problems and their detailed solutions, expanding to fill the 1000-word requirement. The problems should vary in complexity and type, covering different applications of the constant of proportionality.)

Decoding the 6.7 Homework Constant of Proportionality: A Comprehensive Guide

Meta Description: Unlock the secrets of finding the constant of proportionality in your 6.7 homework! This comprehensive guide provides step-by-step solutions, examples, and expert tips to master this crucial math concept.

Keywords: 6.7 homework, constant of proportionality, proportional relationships, direct variation, unit rate, ratio, slope, solving for k, math help, middle school math, algebra, answer key, practice problems, step-by-step solutions.

Introduction:

Are you struggling with your 6.7 homework assignment on the constant of proportionality? Don't worry, you're not alone! Many students find this concept challenging initially, but with a clear understanding of the underlying principles and some practice, you'll master it in no time. This in-depth guide will walk you through everything you need to know about the constant of proportionality, providing clear explanations, worked examples, and even tackling common pitfalls. We'll also explore how this concept relates to other mathematical ideas like unit rate and slope. By the end, you'll be confident in tackling any problem involving the constant of proportionality.

Understanding Proportional Relationships:

Before diving into the constant of proportionality, it's essential to grasp the concept of proportional relationships. A proportional relationship exists between two variables when their ratio remains constant. This means that as one variable increases or decreases, the other variable changes proportionally. We can represent this relationship mathematically as:

$$y = kx$$

where:

y and x are the two variables.

k is the constant of proportionality.

This equation indicates a direct variation: as x increases, y increases proportionally, and as x decreases, y decreases proportionally. The constant k dictates the rate of this change. A larger k indicates a steeper increase in y for a given increase in x .

Finding the Constant of Proportionality (k):

The constant of proportionality, often denoted as 'k', is the crucial element connecting the two variables in a proportional relationship. It represents the ratio between y and x. To find k, you need a set of corresponding values for x and y. Here's how:

1. Identify a pair of corresponding values: Choose any pair (x, y) from the given data or graph that represents the proportional relationship.

1. Calculate the ratio: Divide the y-value by the x-value: $k = y/x$

1. Verify consistency: Check if this ratio holds true for other pairs of (x, y) values in your data. If the ratio remains consistent, you have confirmed a proportional relationship, and the calculated value is your constant of proportionality.

Example 1: Identifying k from a Table

Let's say you have the following table:

x	y
2	6
4	12
6	18
8	24

To find k:

Using the first pair (2, 6): $k = 6/2 = 3$

Using the second pair (4, 12): $k = 12/4 = 3$

Using the third pair (6, 18): $k = 18/6 = 3$

Using the fourth pair (8, 24): $k = 24/8 = 3$

The constant of proportionality (k) is 3. This means that y is always three times the value of x.

Example 2: Identifying k from a Graph:

A graph depicting a proportional relationship will always pass through the origin (0,0) and be a straight line. To find k:

1. Choose any point (x, y) on the line (excluding the origin).

1. Calculate $k = y/x$. The resulting value will be the constant of proportionality. Note that the slope of the line is equal to k.

Example 3: Solving for k in a Word Problem:

"A car travels 150 miles in 3 hours. Assuming a constant speed, what is the constant of proportionality representing the car's speed?"

Here, distance (y) is proportional to time (x).

y = 150 miles

x = 3 hours

$k = y/x = 150 \text{ miles} / 3 \text{ hours} = 50 \text{ miles/hour}$

The constant of proportionality is 50 miles per hour, representing the car's speed.

Common Mistakes and How to Avoid Them:

Incorrect ratio: Ensure you always divide the y-value by the x-value (y/x) to find k . Reversing this will lead to an incorrect answer.

Non-proportional relationships: The constant of proportionality only applies to relationships where the ratio between y and x is constant. If the ratio changes, the relationship is not proportional.

Misinterpreting graphs: Make sure the graph truly represents a proportional relationship before attempting to find k . A curved line or a line that doesn't pass through the origin indicates a non-proportional relationship.

Units: Pay close attention to units when working with word problems. The constant of proportionality will have units reflecting the ratio of the two variables (e.g., miles/hour, dollars/pound).

Advanced Applications:

Understanding the constant of proportionality extends beyond basic algebra. It's fundamental to:

Scale drawings and models: The scale factor is the constant of proportionality.

Unit conversion: Conversion factors are constants of proportionality.

Linear equations: The slope of a linear equation represents the constant of proportionality when the equation is in the form $y = kx$.

Conclusion:

Mastering the constant of proportionality is a crucial step in understanding proportional relationships and various mathematical concepts. By carefully following the steps outlined in this guide and practicing with different examples, you can confidently tackle your 6.7 homework and build a strong foundation for future mathematical studies. Remember to check your work, pay attention to detail, and utilize the various resources available to you, including online tutorials and your teacher's assistance. Good luck!

Additional Resources

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