Proportional vs. Non-Proportional Relationships

Proportional and non-proportional relationships: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

A relationship is proportional if $y = kx$ with one constant k and $(0, 0)$ included. Rows $(2, 6), (4, 12)$ have $y/x = 3$. A fixed starting charge breaks proportionality: $y = 3x + 2$ gives $y = 2$ when $x = 0$.

Worked example

Is this relationship proportional?

x	y
0	0
2	8
5	20

1. At $x = 2$, $y/x = 8/2 = 4$.
2. At $x = 5$, $y/x = 20/5 = 4$.
3. The starting value is 0 at $x = 0$; proportional relationships require 0.
4. All nonzero ratios match and the origin condition is satisfied.
Answer: Proportional.

Practice Problems

Show your thinking.

1. A student says constant increase 3 proves proportionality. Correct the claim.

x	y
1	7
2	10
3	13

2. For a proportional table, $(3, 12)$ and $(5, y)$ are rows. Recover y.

3. A graph is straight but starts at $(0, 5)$. Is it proportional?

x	y
0	5
1	8
2	11

4. Rows $(2, 6), (4, 12), (6, 20)$ should be proportional. Repair only the last output.

5. A student rejects this table because the x steps differ. Decide.

x	y
1	3
2	6
4	12

6. A proportional relationship has $y = 18$ at $x = 6$. Explain why its value at $x = 0$ is 0, then find y at $x = 7$.

Answer Key

1. Not proportional.
2. 20.
3. Not proportional.
4. 18.
5. Proportional.
6. 0 and 21.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. At $x = 1$, $y/x = 7/1 = 7$.
2. At $x = 2$, $y/x = 10/2 = 5$.
3. At $x = 3$, $y/x = 13/3 = \frac{13}{3}$.
4. The unequal ratios or nonzero starting value rule out proportionality.

Problem 2

1. $k = 12/3 = 4$.
2. $y = 4 \times 5 = 20$; $20/5 = 4$ checks.

Problem 3

1. At $x = 1$, $y/x = 8/1 = 8$.
2. At $x = 2$, $y/x = 11/2 = \frac{11}{2}$.
3. The starting value is 5 at $x = 0$; proportional relationships require 0.
4. The unequal ratios or nonzero starting value rule out proportionality.

Problem 4

1. $6/2 = 12/4 = 3$.
2. At $x = 6$, $y = 3 \times 6 = 18$, not 20.

Problem 5

1. At $x = 1$, $y/x = 3/1 = 3$.
2. At $x = 2$, $y/x = 6/2 = 3$.
3. At $x = 4$, $y/x = 12/4 = 3$.
4. All nonzero ratios match and the origin condition is satisfied.

Problem 6

1. $k = 18/6 = 3$.
2. $y(0) = 3 \times 0 = 0$ and $y(7) = 3 \times 7 = 21$.

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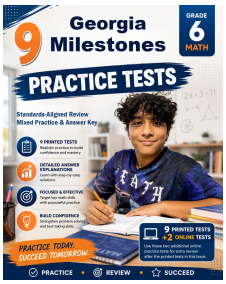

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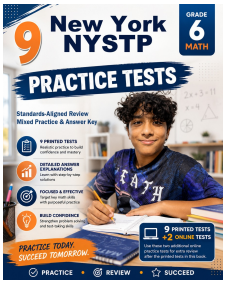

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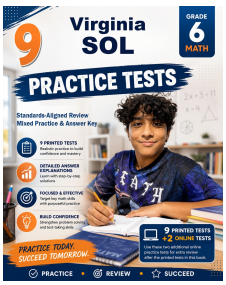

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