Finding the Constant of Proportionality

Spot mistakes, reason, and work backward

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

In $y = kx$, divide output by input: $k = y/x$, not x/y. If 4 meters cost 10 dollars, $k = 10/4 = 2.5$ dollars per meter; the point $(1, 2.5)$ shows that rate.

Worked example

Example: the proportional pair is $(4, 6)$. Find k in $y = kx$ and the pair with $x = 1$.

1. $k = y/x = 6/4 = \frac{3}{2}$.
2. Substitute $x = 1$ into $y = kx$: $y = \frac{3}{2}(1) = \frac{3}{2}$, so the pair is $(1, \frac{3}{2})$.
3. Check the original pair: $\frac{3}{2}(4) = 6$.
Answer: $k = \frac{3}{2}$; $(1, \frac{3}{2})$.

Practice Problems

Show your thinking.

1. Fabric: a student uses $k = x/y = \frac{1}{6}$ for $(4, 24)$. Repair the rule and predict y at $x = 5$.

2. Read the displayed proportional table. Fruit: a student uses $k = x/y = \frac{2}{7}$ for $(4, 14)$. Repair the rule and predict y at $x = 5$.

x	y
4	14
8	28

3. A student reads $y = 4x$ and calls x the constant. Correct the interpretation using $(1, 4)$ and $(3, 12)$.

4. Seed: a student uses $k = x/y = \frac{1}{5}$ for $(5, 25)$. Repair the rule and predict y at $x = 6$. Then find the input that gives twice your predicted output at $x = 6$.

5. Juice: a student uses $k = x/y = \frac{2}{5}$ for $(6, 15)$. Repair the rule and predict y at $x = 7$. Compare the constant with 3: state the exact difference.

6. Wire: a student uses $k = x/y = \frac{2}{7}$ for $(8, 28)$. Repair the rule and predict y at $x = 9$. Explain why its reciprocal has different units.

7. Ink cartridges: a student uses $k = x/y = \frac{1}{7}$ for $(3, 21)$. Repair the rule and predict y at $x = 4$.

8. Ribbon spools: the proportional pair is $(4, 18)$. Find k in $y = kx$ and the pair with $x = 1$.

9. Seed packets: 7 units cost $28.00 proportionally. Find the per-unit constant and whether $31.00 buys 8 units.

10. Refill bottles: a student uses $k = x/y = \frac{4}{15}$ for $(8, 30)$. Repair the rule and predict y at $x = 9$.

Answer Key

1. $k = 6$; $y = 30$.
2. $k = \frac{7}{2}$; $y = \frac{35}{2}$.
3. $k = 4$ output units per input; 12 output units correspond to 3 inputs.
4. $k = 5$; $y = 30$. The doubled-output input is 12.
5. $k = \frac{5}{2}$; $y = \frac{35}{2}$. $k - 3 = -\frac{1}{2}$.
6. $k = \frac{7}{2}$; $y = \frac{63}{2}$. The reciprocal measures input per output instead.
7. $k = 7$; $y = 28$.
8. $k = \frac{9}{2}$; $(1, \frac{9}{2})$.
9. $k = 4$ dollars per unit; no, short by $1.00.
10. $k = \frac{15}{4}$; $y = \frac{135}{4}$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. $k = y/x = 24/4 = 6$.
2. The corrected rule is $y = 6x$; at $x = 5$, $y = 6(5) = 30$.
3. Check the original pair: $6(4) = 24$.

Problem 2

1. $k = y/x = 14/4 = \frac{7}{2}$.
2. The corrected rule is $y = \frac{7}{2}x$; at $x = 5$, $y = \frac{7}{2}(5) = \frac{35}{2}$.
3. Check the original pair: $\frac{7}{2}(4) = 14$.

Problem 3

1. $y/x = 4/1 = 4$ at $(1, 4)$.
2. At $(3, 12)$, $y/x = 12/3 = 4$ also.
3. The number 4 stays fixed while x changes; $12/4 = 3$ inputs.

Problem 4

1. $k = y/x = 25/5 = 5$.
2. The corrected rule is $y = 5x$; at $x = 6$, $y = 5(6) = 30$.
3. Check the original pair: $5(5) = 25$.
4. Double the specified output: $2(30) = 60$. Divide by the constant: $60 \div 5 = 12$. Check: $5(12) = 60$.

Problem 5

1. $k = y/x = 15/6 = \frac{5}{2}$.
2. The corrected rule is $y = \frac{5}{2}x$; at $x = 7$, $y = \frac{5}{2}(7) = \frac{35}{2}$.
3. Check the original pair: $\frac{5}{2}(6) = 15$.
4. $k - 3 = \frac{5}{2} - 3 = -\frac{1}{2}$.

Problem 6

1. $k = y/x = 28/8 = \frac{7}{2}$.
2. The corrected rule is $y = \frac{7}{2}x$; at $x = 9$, $y = \frac{7}{2}(9) = \frac{63}{2}$.
3. Check the original pair: $\frac{7}{2}(8) = 28$.
4. Reciprocal constant $= 8/28 = \frac{2}{7}$ input units per output unit.

Problem 7

1. $k = y/x = 21/3 = 7$.
2. The corrected rule is $y = 7x$; at $x = 4$, $y = 7(4) = 28$.
3. Check the original pair: $7(3) = 21$.

Problem 8

1. $k = y/x = 18/4 = \frac{9}{2}$.
2. Substitute $x = 1$ into $y = kx$: $y = \frac{9}{2}(1) = \frac{9}{2}$, so the pair is $(1, \frac{9}{2})$.
3. Check the original pair: $\frac{9}{2}(4) = 18$.

Problem 9

1. $k = y/x = 28/7 = 4$.
2. Multiply the per-unit cost by 8: $4(8) = 32$ dollars.
3. Required 32 dollars minus budget 31 is 1 dollar.

Problem 10

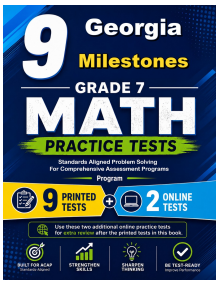
1. $k = y/x = 30/8 = \frac{15}{4}$.
2. The corrected rule is $y = \frac{15}{4}x$; at $x = 9$, $y = \frac{15}{4}(9) = \frac{135}{4}$.
3. Check the original pair: $\frac{15}{4}(8) = 30$.

TESTINAR

Keep Building Grade 7 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 7 books



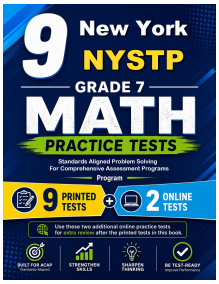
GEORGIA MILESTONES

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



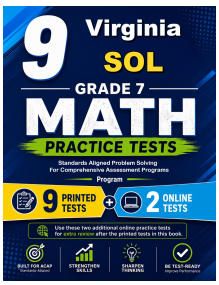
NEW YORK NYSTP

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



VIRGINIA SOL

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 7 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/7