

Direct and Inverse Variation

TSIA2 Math •Section 5.7

Name: _____

Date: _____

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Quick Review and Helpful Hints

Linear relationships have a constant rate of change. Use slope, intercepts, points, and context to move between equations, tables, graphs, and real-world meanings.

▷ **Example:** Write the line with slope 2 through (3, 11).

Work: Use $y = 2x + b$. Substitute the point: $11 = 2(3) + b$, so $b = 5$.

★ **Answer:** $y = 2x + 5$

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- | | |
|--|---|
| 1. Direct variation: $y = 12$ when $x = 3$. Find k .
_____ | 6. If $y = \frac{24}{x}$, find y when $x = 6$.
_____ |
| 2. Write the direct variation equation with $k = -5$.
_____ | 7. Does the table (2, 10), (4, 20), (6, 30) show direct variation?
_____ |
| 3. If $y = 6x$, find y when $x = 7$.
_____ | 8. Does the table (2, 18), (3, 12), (6, 6) show inverse variation?
_____ |
| 4. Inverse variation: $y = 8$ when $x = 5$. Find k .
_____ | 9. For $y = kx$, if $k = 3$ and $y = 27$, find x .
_____ |
| 5. Write the inverse variation equation with $k = 18$.
_____ | 10. For $y = \frac{k}{x}$, if $k = 50$ and $y = 10$, find x .
_____ |

◆ Word Problems

11. The cost is directly proportional to pounds. 4 lb cost \$18. Find the cost of 10 lb.

12. The time to finish a job varies inversely with workers. 6 workers take 8 hours. How long for 12 workers?



Answer Keys

1. $k = 4$

2. $y = -5x$

3. 42

4. 40

5. $y = \frac{18}{x}$

6. 4

7. Yes

8. Yes

9. 9

10. 5

11. \$45

12. 4 hours

Step-by-Step Explanations

- Direct variation runs on $y = kx$, so feed in the pair: $12 = 3k$ tells you $k = 4$.
- Every direct variation looks like $y = kx$, so just slot -5 in for k .
- Swap in 7 for x and multiply: $6 \cdot 7 = 42$.
- Inverse variation is $y = \frac{k}{x}$, so k is the product $xy = 5 \cdot 8 = 40$.
- Inverse variation always takes the shape $y = k/x$, so place 18 on top.
- Pop in 6 for x and divide: $24/6 = 4$.
- Check each y/x ratio — they all equal 5 , so it's steady direct variation.
- Multiply each pair: every product is 36 , the telltale sign of inverse variation.
- Substitute into $y = kx$ to get $27 = 3x$, then divide by 3 to free x .
- From $10 = 50/x$, multiply both sides by x to get $10x = 50$, so $x = 5$.
- Find the per-pound rate first: $18/4 = 4.5$, then 10 pounds costs $10 \cdot 4.5 = \$45$.
- Workers times hours stays constant at $6 \cdot 8 = 48$, so 12 workers finish in $48/12 = 4$ hours.



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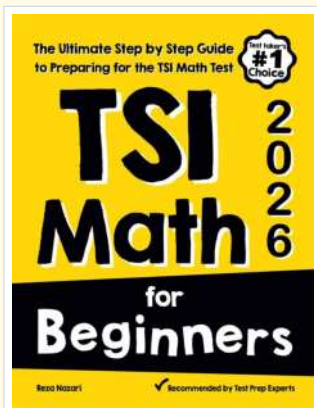
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