

Direct and Inverse Variation

Algebra 1 •Section 5.7

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| Name: _____ | Date: _____ | Score: _____ / 12 |
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Quick Review and Helpful Hints

A function pairs each input with exactly one output. Pay attention to what the input means, what rule is being applied, and whether the question asks for a value, a rule, a domain, or an interpretation.

▶ **Example:** For $f(x) = 2x + 5$, find $f(4)$.

Work: Replace x with 4: $f(4) = 2(4) + 5 = 13$.

★ **Answer:** 13

◆ Practice Problems

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

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|---|--|
| 1. Find the inverse of $f(x) = x + 7$. _____ | 6. Find $f^{-1}(10)$ if $f(x) = 5x$. _____ |
| 2. Find the inverse of $f(x) = 3x$. _____ | 7. Find the inverse of $f(x) = -x + 6$. _____ |
| 3. Find the inverse of $f(x) = 2x - 5$. _____ | 8. Verify one point: if $(4, 11)$ is on f , what point is on f^{-1} ? _____ |
| 4. Find the inverse of $f(x) = \frac{x}{4} + 1$. _____ | 9. Find the inverse of $f(x) = \frac{2}{3}x + 8$. _____ |
| 5. Are $f(x) = x - 9$ and $g(x) = x + 9$ inverses? _____ | 10. Is $f(x) = x^2$ over all real numbers one-to-one? _____ |

◆ Word Problems

11. A Celsius formula is $F = \frac{9}{5}C + 32$. Solve for C .

12. A machine multiplies by 4 and then adds 3. What inverse steps undo it?



Answer Keys

1. $f^{-1}(x) = x - 7$

2. $f^{-1}(x) = \frac{x}{3}$

3. $f^{-1}(x) = \frac{x+5}{2}$

4. $f^{-1}(x) = 4x - 4$

5. Yes

6. 2

7. $f^{-1}(x) = -x + 6$

8. (11, 4)

9. $f^{-1}(x) = \frac{3}{2}(x - 8)$

10. No

11. $C = \frac{5}{9}(F - 32)$

12. Subtract 3, then divide by 4

Step-by-Step Explanations

1. An inverse reverses the action: this function adds 7, so its inverse subtracts 7.
2. To undo multiplying by 3, you do the opposite — divide by 3.
3. Trade x and y , then untangle $x = 2y - 5$ for y to reveal the inverse.
4. Swap, then solve $x = y/4 + 1$: subtract the 1, multiply by 4, and you've reversed it.
5. They cancel each other out — subtracting 9 and adding 9 bring you right back to start.
6. The inverse asks: what input would have produced 10? Solve $5x = 10$ to find 2.

7. Swap and solve and you get the exact same rule — this line is its own inverse, kind of cool.
8. Inverses trade inputs and outputs, so the point simply flips its coordinates.
9. Peel off the 8 first, then multiply by the reciprocal $\frac{3}{2}$ to undo the $\frac{2}{3}$.
10. Both 2 and -2 map to 4, so reversing it would leave 4 confused about where to go.
11. Work backward from F : subtract 32, then multiply by $\frac{5}{9}$ to free C .
12. To unwind a process, reverse both the steps and their order — last action gets undone first.



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