Direct and Inverse Variation

Algebra 1 •Section 5.7

Name: _____	Date: _____	Score: _____ / 12

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.

1. Find the inverse of $f(x) = x + 7$.

2. Find the inverse of $f(x) = 3x$.

3. Find the inverse of $f(x) = 2x - 5$.

4. Find the inverse of $f(x) = \frac{x}{4} + 1$.

5. Are $f(x) = x - 9$ and $g(x) = x + 9$ inverses?

6. Find $f^{-1}(10)$ if $f(x) = 5x$.

7. Find the inverse of $f(x) = -x + 6$.

8. Verify one point: if $(4, 11)$ is on f, what point is on f^{-1}?

9. Find the inverse of $f(x) = \frac{2}{3}x + 8$.

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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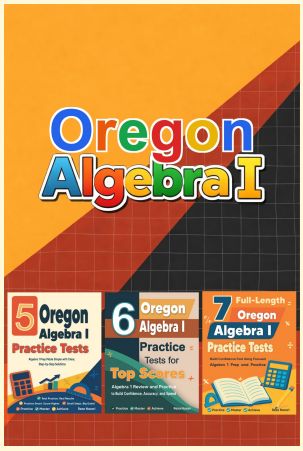

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