ALBERT

Name _____ Date _____

Inverse Functions Worksheet

Algebra 1 · Common Core HSF-BF.B.4a

> Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x–1)$ for $x \neq 1$.

Practice

Builds the skill step by step.

1. f(x) = x + 5. What is $f^{-1}(12)$?

2. f(x) = 3x. What is $f^{-1}(21)$?

3. f(x) = 2x − 4. Solve f(x) = 10.

4. What is the inverse of f(x) = x − 9?

   A. $f^{-1}(x) = x + 9$

   B. $f^{-1}(x) = 9 - x$

   C. $f^{-1}(x) = x - 9$

   D. $f^{-1}(x) = 9x$

5. f(x) = x ÷ 4. What is $f^{-1}(5)$?

6. What does an inverse function do?

   A. It doubles the output.

   B. It changes the sign of f(x).

   C. It undoes the function: $f^{-1}(f(x)) = x$.

   D. It gives the reciprocal: $1 \div f(x)$.

7. $f(x) = 5x + 1$. What is $f^{-1}(26)$?

8. $f(x) = x^3$. What is $f^{-1}(8)$?

9. How is the graph of an inverse related to the graph of the function?

   A. It is shifted up.

   B. It is reflected across the line $y = x$.

   C. They are the same.

   D. It is reflected across the x-axis.

10. $f(2) = 9$. What is $f^{-1}(9)$?

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On Level

Grade-level practice.

1. $f(x) = 2x^3$. What is $f^{-1}(54)$?

2. What is the inverse of $f(x) = 2x^3$?

   A. $f^{-1}(x)$ = the cube root of $(x \div 2)$

   B. $f^{-1}(x)$ = (the cube root of x) ÷ 2

   C. $f^{-1}(x)$ = 2 times the cube root of x

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

3. $f(x) = (x + 1) \div (x - 1)$, $x \neq 1$. Solve $f(x) = 3$.

4. For $x \neq 1$, what is the inverse of $f(x) = (x + 1) \div (x - 1)$?

   A. $f^{-1}(x) = (1 - x) \div (1 + x)$

   B. $f^{-1}(x) = (x - 1) \div (x + 1)$

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

   D. $f^{-1}(x) = (x + 1) \div (x - 1)$

5. $f(x) = (x - 3) \div 2$. What is $f^{-1}(5)$?

6. Find the inverse of $f(x) = 4x - 7$ and explain your steps.

7. $F = \frac{9}{5}C + 32$ converts Celsius to Fahrenheit. Use the inverse to find the Celsius temperature when $F = 212$.

8. $f(x) = 10 - x$. What is $f^{-1}(3)$?

9. The point (3, 8) is on the graph of f. Which point must be on the graph of f^{-1}?

   A. (8, 3)

   B. (3, 8)

   C. (−3, −8)

   D. (3, −8)

10. $f(x) = x \div 3 + 2$. What is $f^{-1}(5)$?

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Challenge

Multi-step and word problems that stretch it.

1. $f(x) = x^3 + 1$. What is $f^{-1}(28)$?

2. $f(x) = 2 \div (x - 1)$, $x \neq 1$. Solve $f(x) = 4$.

3. $f(x) = 5 - 2x$. What is $f(f^{-1}(7))$?

4. Why doesn't $f(x) = x^2$, for all real x, have an inverse function?

   A. Its graph is a line.

   B. It has an inverse: $\sqrt{x}$.

   C. Two inputs give the same output, like $f(2) = f(-2) = 4$.

   D. It has no outputs.

5. $f(x) = (2x + 1) \div (x - 3)$, $x \neq 3$. Solve $f(x) = 1$.

6. A taxi costs $C(m) = 3 + 2m$ dollars for m miles. How many miles does 19 dollars buy?

7. $f(x) = ax + 2$ and $f^{-1}(10) = 4$. What is a?

8. Explain why $f(x) = x^2$, for all real x, has no inverse function, and how to fix it.

9. $f(x) = (x + 1) \div (x - 1)$, $x \neq 1$. What is $f^{-1}(5)$?

10. $f(x) = 3x - 6$ and g is the inverse of f. What is $g(f(10))$?