LESSON MAKER PRO

Reverse Function Lab

Undo a function to find the original input.

HIGH SCHOOL · MA.912.F.3.9

MA.912.F.3.9 "Solve mathematical and real-world problems involving inverse functions."

NAME _____ DATE _____

UNDO THE RULE

An inverse function reverses the rule of the original function. To find an inverse, write y = f(x), switch x and y, then solve for y. An inverse should return the original input when it undoes the function.

WORKED EXAMPLE

Find the inverse of $g(x) = 4x + 11$.

1. Write $y = 4x + 11$.
2. Switch x and y: $x = 4y + 11$.
3. Subtract 11: $x - 11 = 4y$.
4. Divide by 4: $y = (x - 11)/4$.

Answer: $g^{-1}(x) = (x - 11)/4$

PRACTICE 6 problems

1 Find the inverse of f(x) = 3x - 8.

ANSWER _____

2 Find the inverse of h(x) = (x + 2)/7.

ANSWER _____

3 Find the inverse of $p(x) = x^2 - 9$, where x >= 0.

ANSWER _____

4 Find the inverse of q(x) = 12 - 5x.

ANSWER _____

5 For r(x) = 2x + 13, find $r^{-1}(23)$.

ANSWER _____

6 Let m(x) = 3x + 1 and n(x) = x - 6. Find the inverse of m(n(x)).

ANSWER _____

APPLY IT Show your work

1 A music app gives a creator score using the rule score = 3x + 12, where x is the number of downloads in hundreds. A creator has a score of 42. How many downloads does the creator have?

WORK SPACE

ANSWER _____

2 At a skateboard shop, a deck length in centimeters is found using C = 2.54x, where x is the length in inches. A deck is 76.2 centimeters long. How long is it in inches?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find the inverse of u(x) = (3x + 2)/(x - 5). State the value that x cannot equal in the inverse function.

WORK SPACE AND ANSWER

ANSWER KEY

Reverse Function Lab

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the inverse of f(x) = 3x - 8.	**$f^{-1}(x) = (x + 8)/3$**
2	Find the inverse of h(x) = (x + 2)/7.	**$h^{-1}(x) = 7x - 2$**
3	Find the inverse of p(x) = x^2 - 9, where x >= 0.	**$p^{-1}(x) = \text{sqrt}(x + 9)$**
4	Find the inverse of q(x) = 12 - 5x.	**$q^{-1}(x) = (12 - x)/5$**
5	For r(x) = 2x + 13, find $r^{-1}(23)$.	**5**
6	Let m(x) = 3x + 1 and n(x) = x - 6. Find the inverse of m(n(x)).	**$(m(n(x)))^{-1} = (x + 17)/3$**

PART 2 · APPLY IT

1. **1,000 downloads** Set 42 = 3x + 12 and solve to get x = 10. Since x counts hundreds of downloads, 10 means 1,000 downloads.
2. **30 inches** Use the inverse rule x = C/2.54. Substitute 76.2 for C to get x = 30.

CHALLENGE

$u^{-1}(x) = (5x + 2)/(x - 3)$, where x != 3

Accept algebraically equivalent inverse rules and equivalent restriction wording. For the music score problem, accept x = 10 only when it is identified as 10 hundreds, or 1,000 downloads.