LESSON MAKER PRO

Inverse Unlock

Reverse a function to solve for the input.

HIGH SCHOOL · HSF-BF.B.4a

CCSS.Math.Content.HSF-BF.B.4a "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) =2 x 3 or f(x) = (x+1)/(x-1) for x ≠ 1."

NAME _____ DATE _____

REVERSE THE RULE

To find an inverse, write y=f(x), switch x and y, and solve for y. If f has an inverse, you can solve f(x)=c by finding f^(-1)(c). Keep any domain restrictions that prevent a denominator from being zero or make a function one-to-one.

WORKED EXAMPLE

For f(x)=8x-11, find f^(-1)(x) and solve f(x)=29.

1. Write y=8x-11.
2. Swap x and y: x=8y-11.
3. Solve for y: y=(x+11)/8.
4. Evaluate the inverse: f^(-1)(29)= (29+11)/8=5.

Answer: f^(-1)(x)=(x+11)/8; x=5

PRACTICE 6 problems

1 For f(x)=3x+2, find f^(-1)(x). Then solve f(x)=20.

ANSWER _____

2 For f(x)=(x-1)/6, find f^(-1)(x). Then solve f(x)=4.

ANSWER _____

3 For f(x)=7-2x, find f^(-1)(x). Then solve f(x)=1.

ANSWER _____

4 For f(x)=(x+2)/(x-3), x != 3, find f^(-1)(x). Then solve f(x)=4.

ANSWER _____

5 For f(x)=(7x+1)/3, find f^(-1)(x). Then solve f(x)=6.

ANSWER _____

6 For f(x)=x^2 with x >= 0, find f^(-1)(x). Then solve f(x)=49.

ANSWER _____

APPLY IT Show your work

1 A student orders custom stickers. The total cost, in dollars, is C(n)=6n+4, where n is the number of stickers. Write C^(-1)(x). Then find how many stickers were ordered if the total cost was $22.

WORK SPACE

ANSWER _____

2 During a science club project, a sensor reports temperature in kelvins using K(c)=c+273, where c is the temperature in degrees Celsius. Write K^(-1)(x). Then find the Celsius temperature when the sensor reads 293 K.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

For f(x)=(2x-3)/(x+4), x != -4, write f^(-1)(x), solve f(x)=1, and state the excluded value for the inverse.

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ANSWER KEY # Inverse Unlock

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For f(x)=3x+2, find f^(-1)(x). Then solve f(x)=20.	**f^(-1)(x)=(x-2)/3; x=6**
2	For f(x)=(x-1)/6, find f^(-1)(x). Then solve f(x)=4.	**f^(-1)(x)=6x+1; x=25**
3	For f(x)=7-2x, find f^(-1)(x). Then solve f(x)=1.	**f^(-1)(x)=(7-x)/2; x=3**
4	For f(x)=(x+2)/(x-3), x != 3, find f^(-1)(x). Then solve f(x)=4.	**f^(-1)(x)=(3x+2)/(x-1), x != 1; x=14/3**
5	For f(x)=(7x+1)/3, find f^(-1)(x). Then solve f(x)=6.	**f^(-1)(x)=(3x-1)/7; x=17/7**
6	For f(x)=x^2 with x >= 0, find f^(-1)(x). Then solve f(x)=49.	**f^(-1)(x)=sqrt(x), x >= 0; x=7**

PART 2 · APPLY IT

1. **C^(-1)(x)=(x-4)/6; 3 stickers** Reverse the cost rule by subtracting 4 and dividing by 6. C^(-1)(22)=(22-4)/6=3.
2. **K^(-1)(x)=x-273; 20 degrees Celsius** Reverse the conversion by subtracting 273. K^(-1)(293)=293-273=20.

CHALLENGE

f^(-1)(x)=(4x+3)/(2-x), x != 2; f(x)=1 when x=7.

Accept algebraically equivalent inverse expressions, including equivalent forms with both numerator and denominator multiplied by -1. Require the stated restrictions for the rational functions and the nonnegative domain for the square function.