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## Lesson 5: Inverse Universe

### Practice Understanding

#### Learning Focus

Match a function and its inverse given a table, a graph, or an equation.

Use a representation of a function to create a second representation.

*If functions are represented in different forms, how can we determine if they are inverses?*

#### Open Up the Math

### Launch, Explore, Discuss

You and your partner have each been given a set of cards.

1. Begin by looking at only the A cards.
2. Use the blank cards to make one more representation for each of the A cards. Now, you will have two A1 cards, two A2 cards, etc.
3. Lay the pairs of A cards out in front of you with the pairs together.
4. Now, select a B card, and show it to your partner.
5. Work together to find a pair of A cards that represent the inverse of the function on your B card.
6. In the space below, record the cards you selected and the reason you know they are inverses.
7. Repeat the process until all the cards are in a matching set of three.

For this task only, assume that all tables represent points on a continuous function.



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1.

A CARD	B CARD	JUSTIFICATION
A1		
A2		
A3		
A4		
A5		
A6		
A7		
A8		
A9		
A10		



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## Ready for More?

Create your own set of cards with 3 inverse pairs. When you have finished, trade with other students. You can match their sets, and they can match yours. Have fun!

## Takeaways

Verify inverse functions using the definition:

$f(x)$  and  $g(x)$  are inverses if and only if  $f(g(x)) = x$  and  $g(f(x)) = x$ .

## Lesson Summary

In this lesson, we matched a function and its inverse with different representations. We found strategic ways to see if the inputs and outputs of the two functions have been switched. We also learned to verify that two functions are inverses using  $f(g(x)) = x$  and  $g(f(x)) = x$ .



## Retrieval

Use properties of exponents to write an equivalent expression. Write your answer in exponential



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form with positive exponents.

1. Use properties of exponents to write an equivalent expression. Write your answer in exponential form with positive exponents.

$$\sqrt[5]{x^2} \cdot \sqrt[3]{x}$$

2. Given:  $f(x) = 5x - 7$  and  $g(x) = \frac{(x+7)}{5}$

Calculate  $f(g(x))$  and  $g(f(x))$  for the pair of functions. Are  $f(x)$  and  $g(x)$  inverses?