Learning Guide Module

Subject Code	Math 3	Mathematics 3
Module Code	7.0	*Inverse Functions*
Lesson Code	7.2.2	*Graphs of Inverse Functions 2*
Time Limit		30 minutes

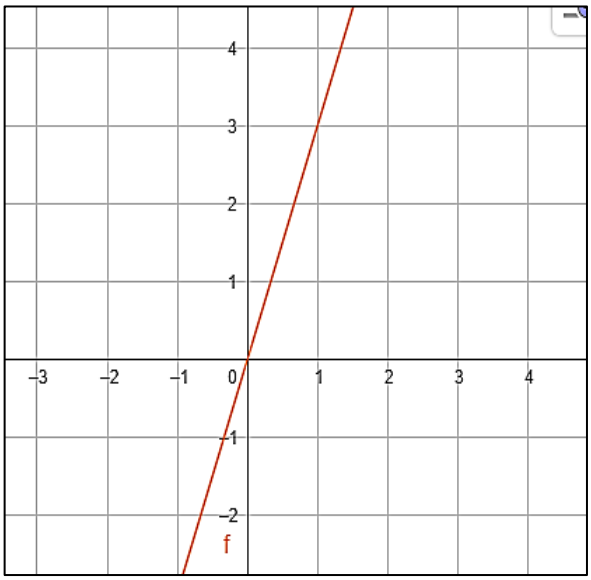
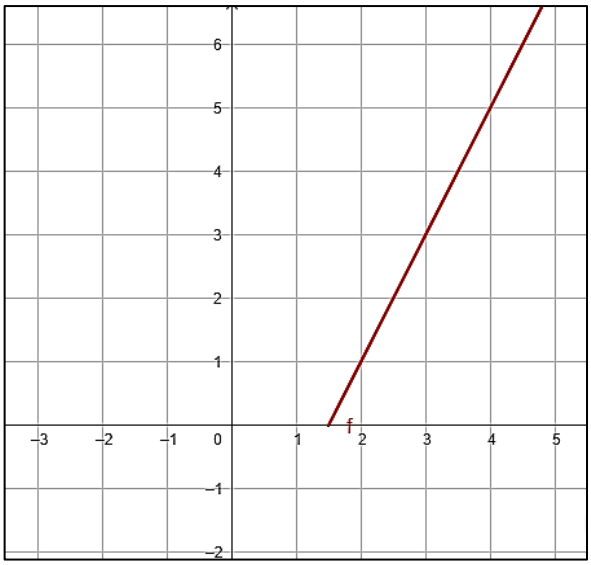
NAVIGATE

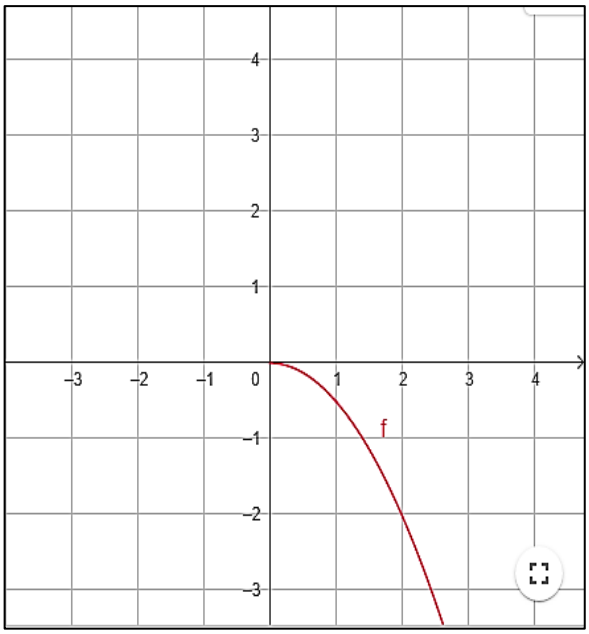
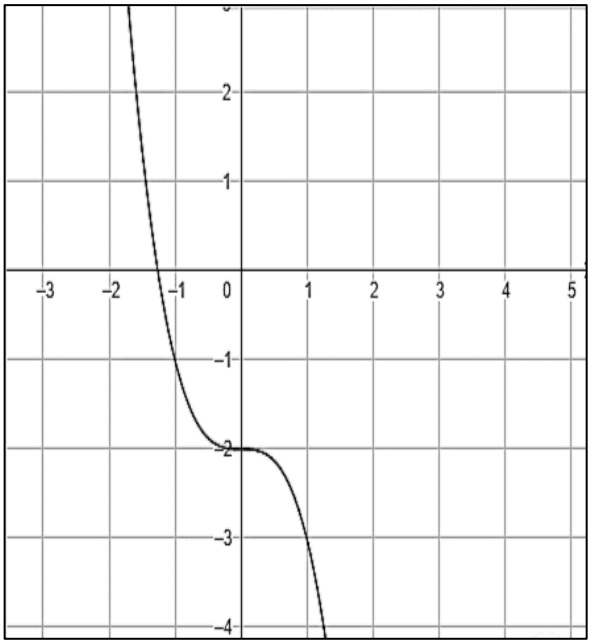
Time Allocation: 15 minutes
Actual Time Allocation: _____ minutes

Note: Items marked with an asterisk (*) will be graded.

Check Your Understanding!

A. Sketch the inverse of each given function below. Identify the domain and range of f^{-1}, and the value of $f^{-1}(x)$ given a certain value of x.

1. $f(x) = 3x$ Domain of f^{-1}: Range of f^{-1}: $f^{-1}(3) =$	
*2. $f(x) = \lvert 2x - 3 \rvert$ $for\ x \geq \frac{3}{2}$ Domain of f^{-1}: Range of f^{-1}: $f^{-1}(1) =$	

3. $f(x) = -\frac{1}{2}x^2 \ for\ x \geq 0$ Domain of f^{-1}: Range of f^{-1}: $f^{-1}(2) =$	
*4. $f(x) = -x^3 - 2$ Domain of f^{-1}: Range of f^{-1}: $f^{-1}(-2) =$	

B. Restrict the domains of the following functions to have defined inverse functions.

5. $f(x) = x^2 + 4x$

* 6. $f(x) = -3x^2 + 7x - 1$

7. $f(x) = |3x + 1|$

* 8. $f(x) = -|4x - 3|$

KNOT

Time Allocation: 15 minutes
Actual Time Allocation: _____ minutes

Let us summarize!

To sketch the graph of the inverse of the given a function, there is a need to have a table of values for the given function. Interchanging the values of *x* and *y* for each point will give us the ordered points to graph the inverse of the function. We also recall the steps on how to find the inverse of the function to help us sketch the graph.

Remember that if the point $(x, f(x))$ is on the graph of the function, then the graph of its inverse contains the point $(f(x), x)$.

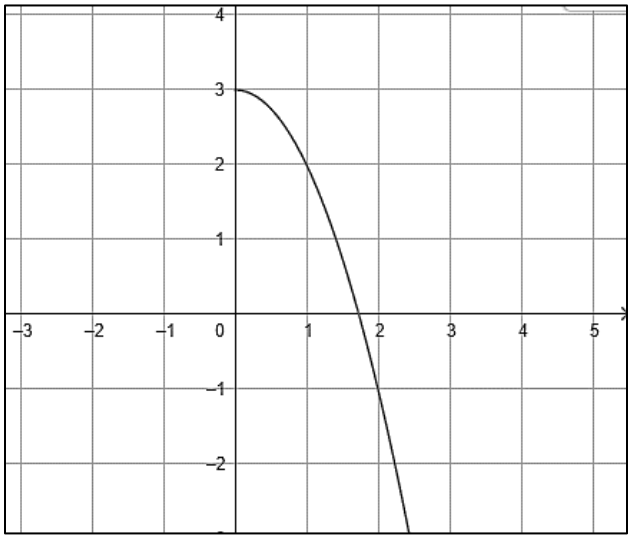
If the given function is not one – to – one, we need to restrict its domain by choosing an interval that will make it one – to – one so that its resulting inverse will be a function.

The resulting graph of a one – to – one function and its inverse is symmetric with respect to the line $y = x$.

How much have you learned? Take the graded quiz below to test your understanding of the concepts discussed in Learning Guide 7.2.1.

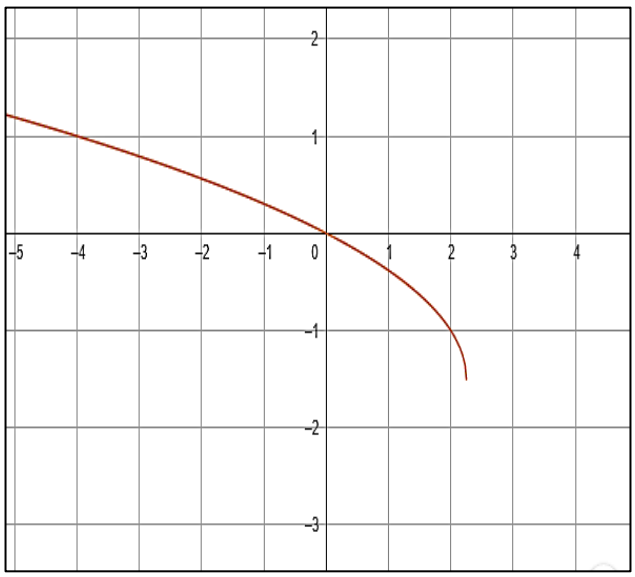
A. Match-Them-Atics!

Directions: Match the given functions to graphs of their inverses. Write only the letter of your answer on the space provided before the number. (*Note*: Some domains of the of the inverses are restricted to have define inverse functions.)

Column A	Column B
_____ 1. $f(x) = -2 - 3x$	A. 

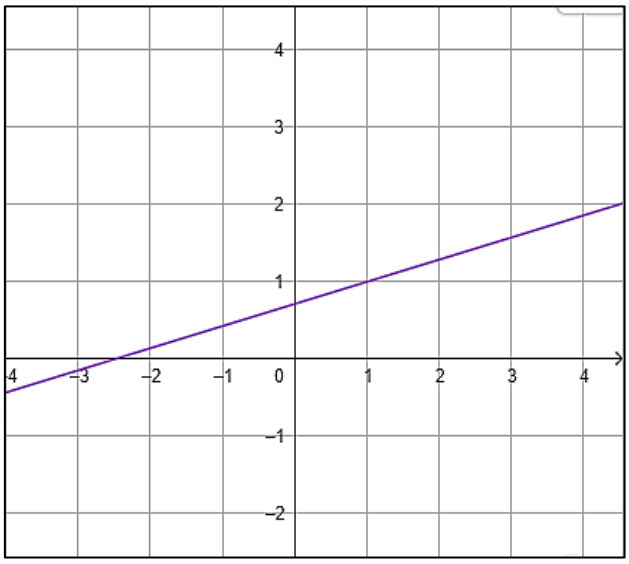
_____ 2. $f(x) = \frac{7}{2}x - \frac{5}{2}$

B.



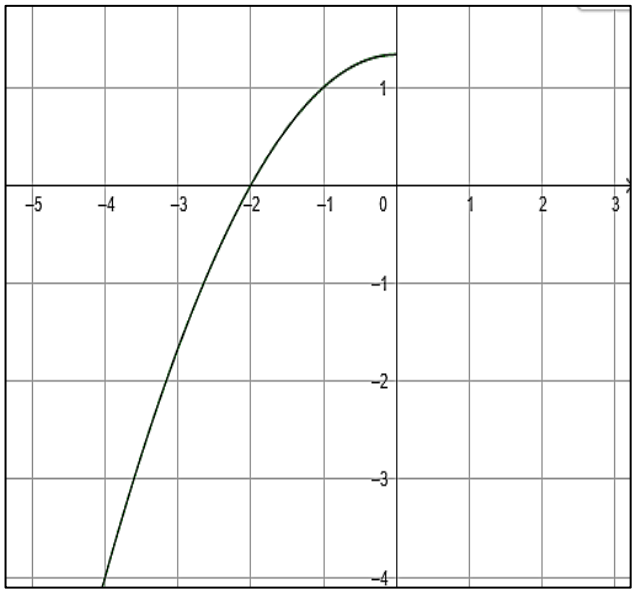
_____ 3. $f(x) = \sqrt{-x+3}$

C.

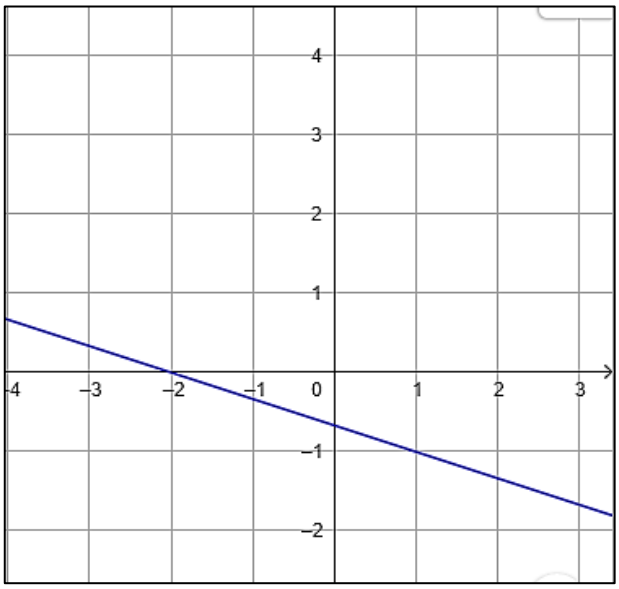


_____ 4. $f(x) = -\sqrt{4-3x}$

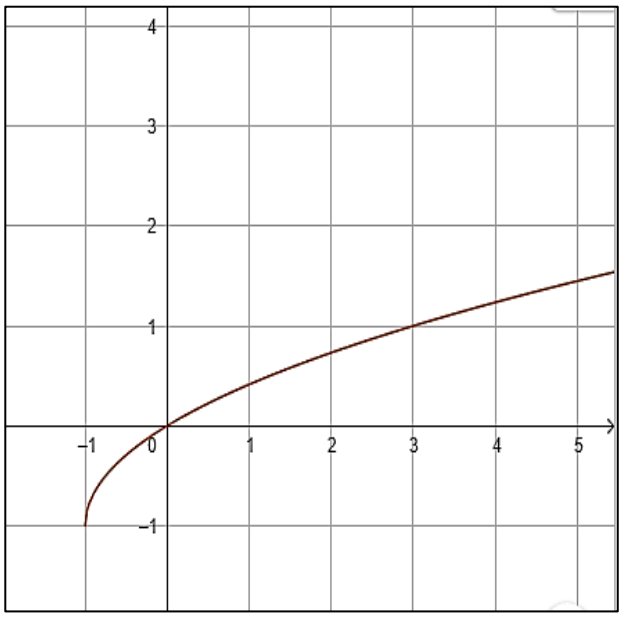
D.



_____ 5. $f(x) = x^2 + 2x, x \geq -1$ E.



_____ 6. $f(x) = -x^2 - 3x, x \geq -\frac{3}{2}$ F.



B. *Given* $f(x) = \frac{3}{2}x - \frac{1}{4}$, *sketch the graphs of* f *and* f^{-1}.

References:

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Prepared by: Frederick F. Faz
Position: Special Science Teacher (SST) II
Campus: PSHS – MRC

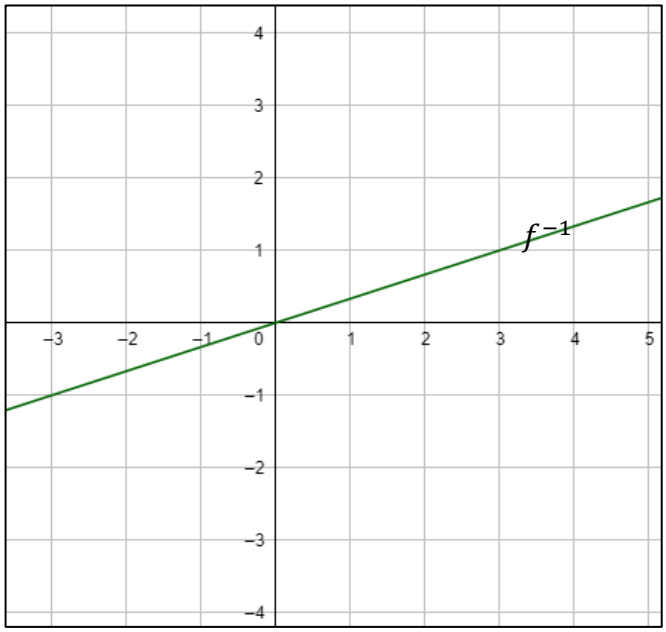
Reviewed by: Virginia A. Barlas
Position: Special Science Teacher (SST) IV
Campus: PSHS - WVC

ANSWER KEY

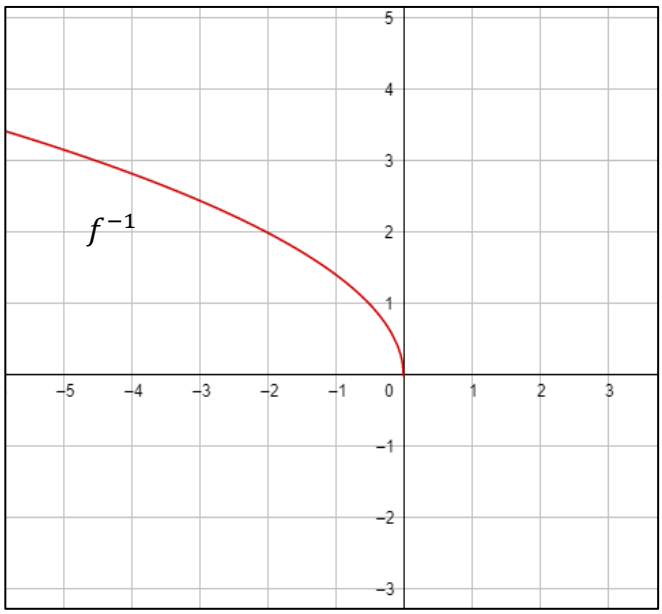
Check Your Understanding

A.

1. Domain of f^{-1}: $x \geq 0$
   Range of f^{-1}: $y \geq \frac{3}{2}$
   $f^{-1}(3) = \mathbf{1}$



3. Domain of f^{-1}: $x \leq 0$
   Range of f^{-1}: $y \geq 0$
   $f^{-1}(2)$; 2 is not included in the domain of f^{-1}



B. 5. $x \geq -2$ or $x \leq -2$

7. $x \geq -\frac{1}{3}$ or $x \leq -\frac{1}{3}$