



# Exponential Reflections

## Student Activity

Name \_\_\_\_\_

Class \_\_\_\_\_

### Problem 1 – Reflecting the Exponential Function

Enter the equation  $y = e^x$  on the  $\boxed{y=}$  screen. Then press  $\boxed{\text{window}}$  and change the following parameters: **Xmax=5** and **Ymax=5**. Leave all others the same. Press  $\boxed{\text{graph}}$  to observe its graph.

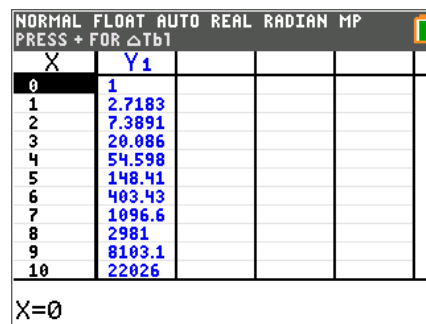
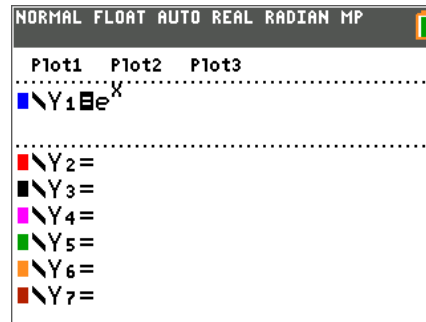
1. What would the inverse of this graph look like?

Recall that an inverse of a function is found when the input ( $x$ ) is switched with the output ( $y$ ).

Press  $\boxed{2\text{nd}}$   $\boxed{\text{table}}$  to access a table of values for your function.

2. Record the  $y$ -values under the original  $y$ -value column in the table below.

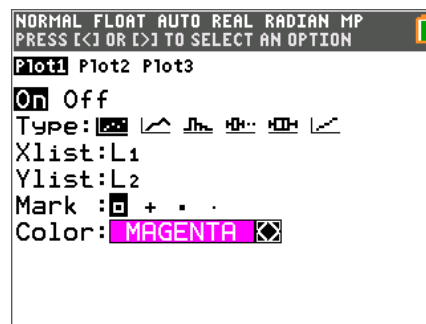
Next record the inverses of each point by switching the  $x$ - and  $y$ -values and recording the results in the inverse columns in the table below.



Original x-value	Original y-value	Inverse x-value	Inverse y-value
-2			
-1			
0			
1			
2			
3			

Now, plot out these inverse points by pressing  $\boxed{\text{stat}}$   $\boxed{\text{enter}}$  and entering the inverse values in **L1** and **L2**.

To set up the scatter plot of the two lists, press  $\boxed{2\text{nd}}$   $\boxed{\text{stat plot}}$  and match the screen to the right. Now press  $\boxed{\text{graph}}$  to observe the plotted values.





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3. What do you notice about the plotted values?

Graph the equation  $y = x$  to test your observation.

4. Find the inverse of  $y = e^x$ . This is done by switching  $x$  and  $y$  (exchanging the input with the output) in the equation and solve for  $y$ .

Check your result by graphing this result to see if it passes through all the plotted points.

### Extension – Reflecting $y = 10^x$

Repeat the process of the activity, but use  $y = 10^x$ .

5. Find the inverse of  $y = 10^x$ .