**Topic**: The general log rule

**Question**: Write the inverse of the function.

$$\log_7(x) = y$$

**Answer choices**:

A $7^y = x$

B $7^x = y$

C $x^7 = y$

D $y^7 = x$

**Solution**: B

We know that inverse functions have their $x$- and $y$-values swapped. So we could write the inverse of $\log_7(x) = y$ by switching $x$ and $y$ to get

$$\log_7(y) = x$$

This is the inverse function, but all the answer choices are exponential functions. So to find the right answer, we can use the general log rule to convert this log function into an exponential function.

By the general log rule, the exponential function that's associated with $\log_7(y) = x$ is

$$7^x = y$$

**Topic**: The general log rule

**Question**: The table shows points of the graph of an exponential function. Choose the set of points that will be on the graph of its inverse.

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $y=3^x$ | 3 | 9 | 27 | 81 |

**Answer choices**:

A $\left(1,\frac{1}{3}\right)$, $\left(2,\frac{2}{9}\right)$, $\left(3,\frac{1}{9}\right)$, and $\left(4,\frac{4}{81}\right)$

B $(3,3)$, $(9,9)$, $(27,27)$, and $(81,81)$

C $(1,3)$, $(2,9)$, $(3,27)$, and $(4,81)$

D $(3,1)$, $(9,2)$, $(27,3)$, and $(81,4)$

**Solution**: D

The points of the graph of the inverse of a function $f$ are obtained by switching the $x$ and $y$ coordinates of the points of the graph of $f$. The points given in the table are $(1,3)$, $(2,9)$, $(3,27)$, and $(4,81)$. If we want to find a set of points that are on the graph of the inverse function, we just need to switch the $x$ and $y$ coordinates of each of those points. So

$(1,3)$ becomes $(3,1)$,

$(2,9)$ becomes $(9,2)$,

$(3,27)$ becomes $(27,3)$, and

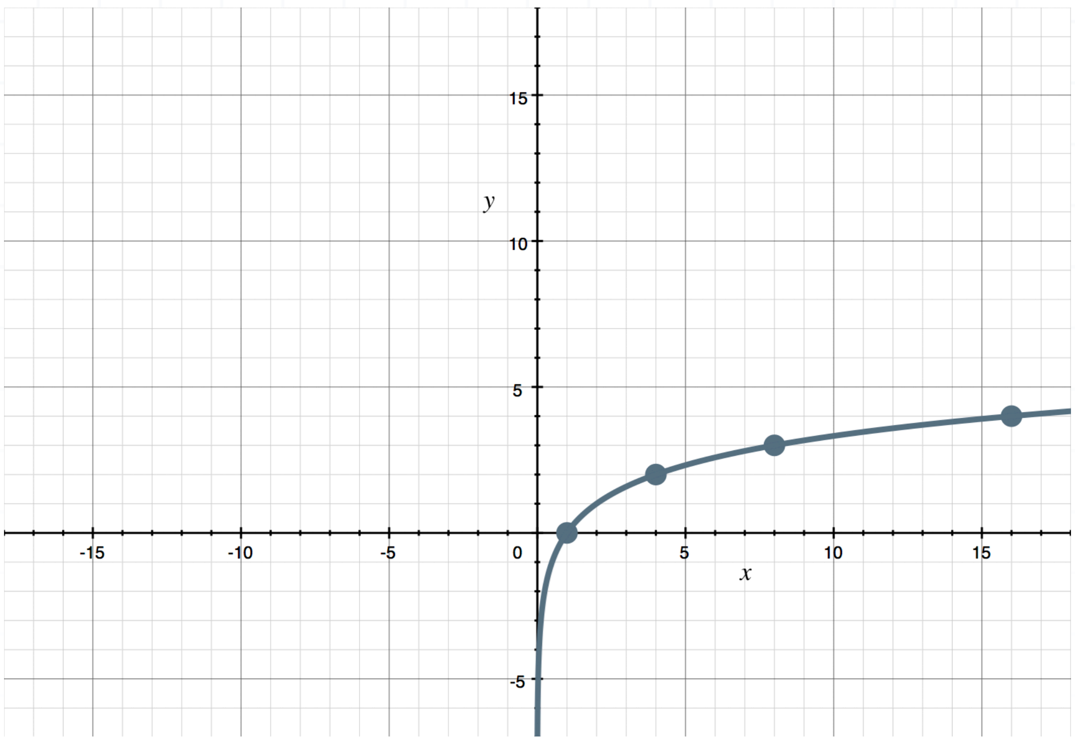
$(4,81)$ becomes $(81,4)$

The points we get are

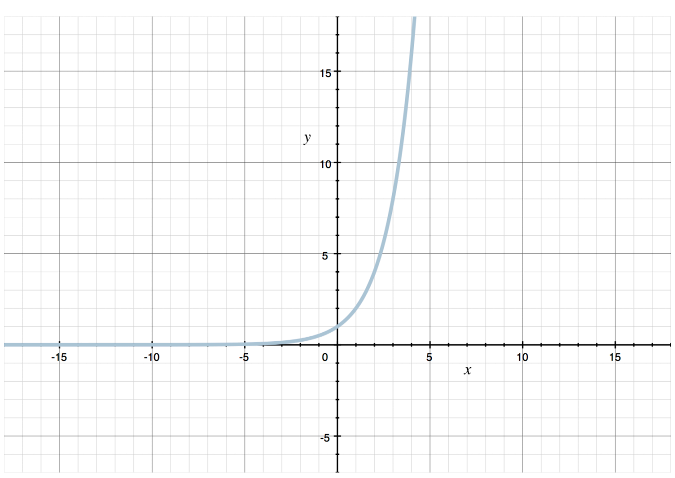
$(3,1)$, $(9,2)$, $(27,3)$, and $(81,4)$

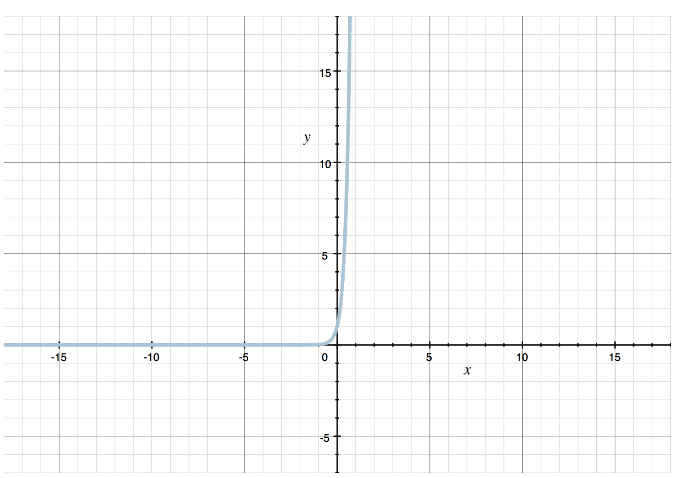
**Topic**: The general log rule

**Question**: The graph shown represents an invertible function and passes through the points $(1,0)$, $(4,2)$, $(8,3)$, and $(16,4)$. Which is the graph of its inverse?

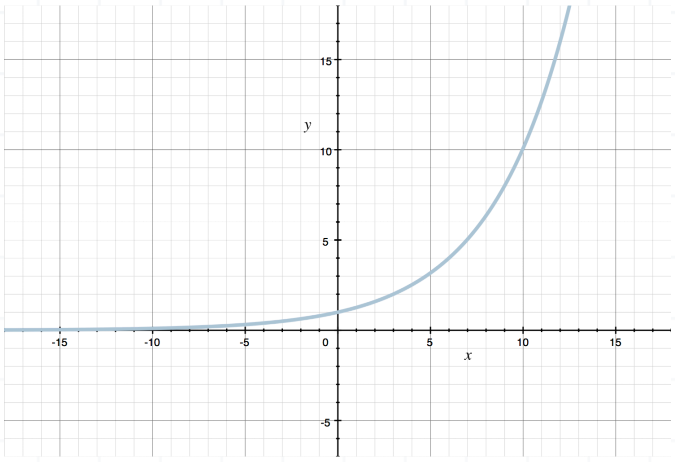


**Answer choices**:

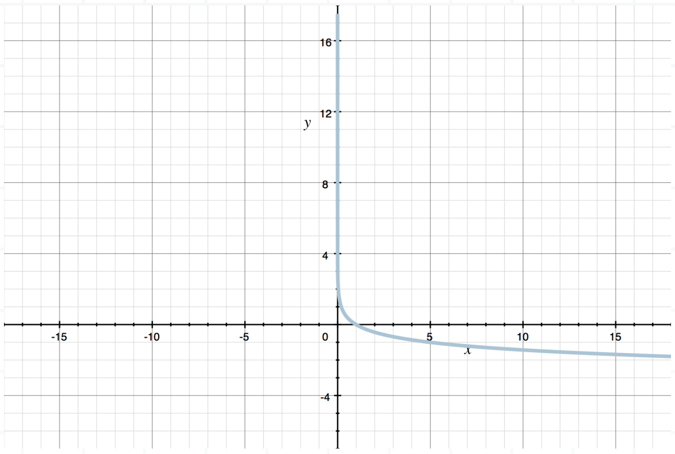
A 

B 

C



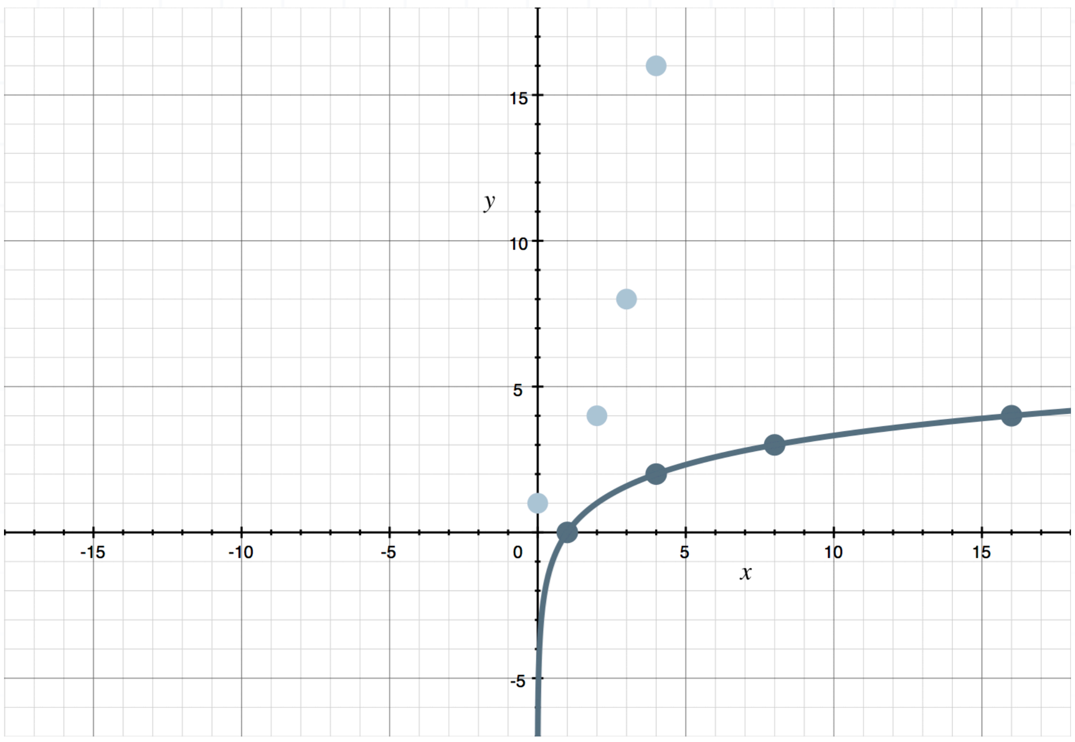

D



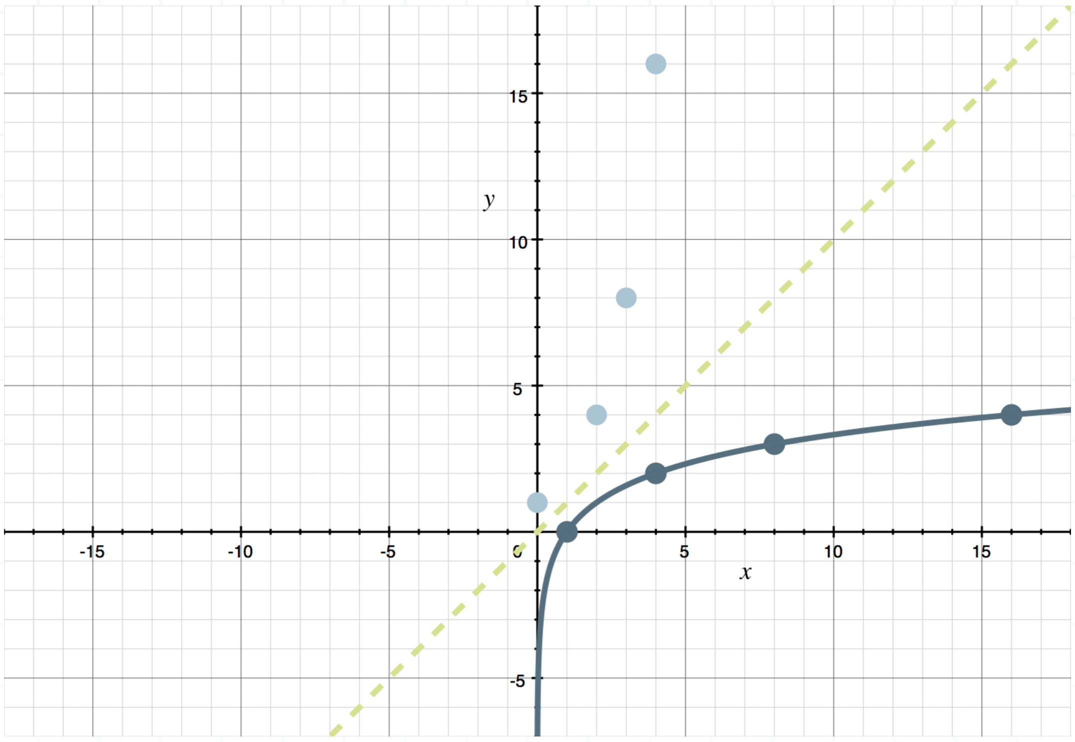
**Solution**: A

Because the given graph represents an invertible function and passes through the points $(1,0)$, $(4,2)$, $(8,3)$, and $(16,4)$, the graph of its inverse must pass through the points $(0,1)$, $(2,4)$, $(3,8)$, and $(4,16)$.

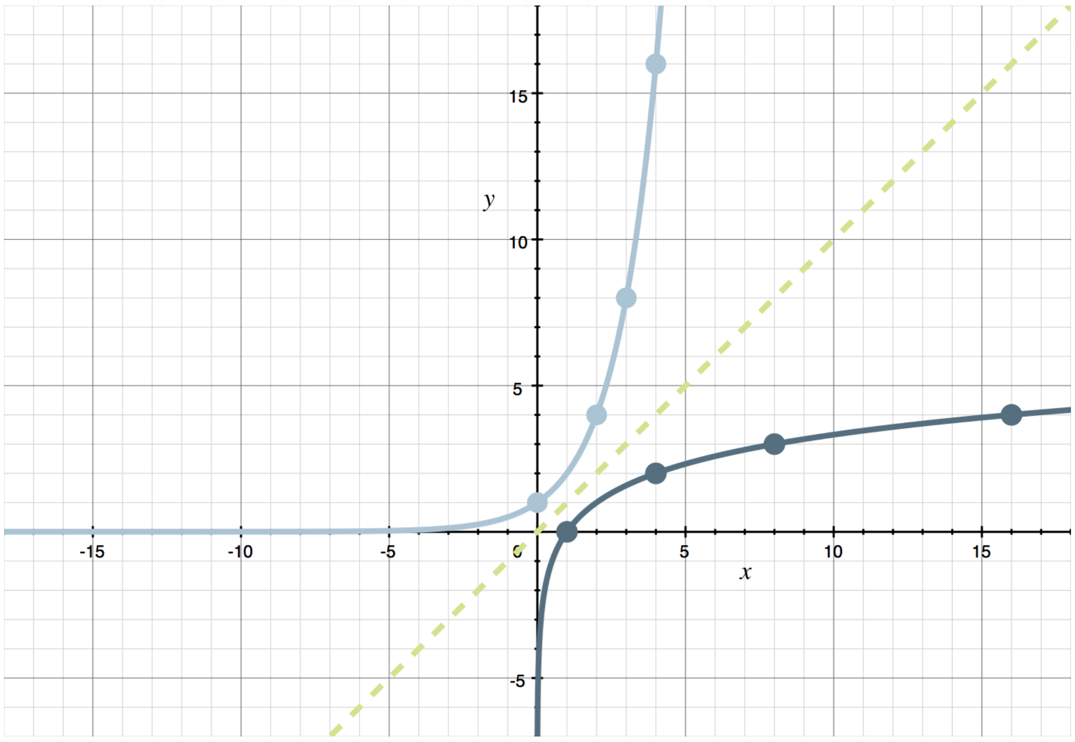
Plot the two sets of points on the same set of axes.



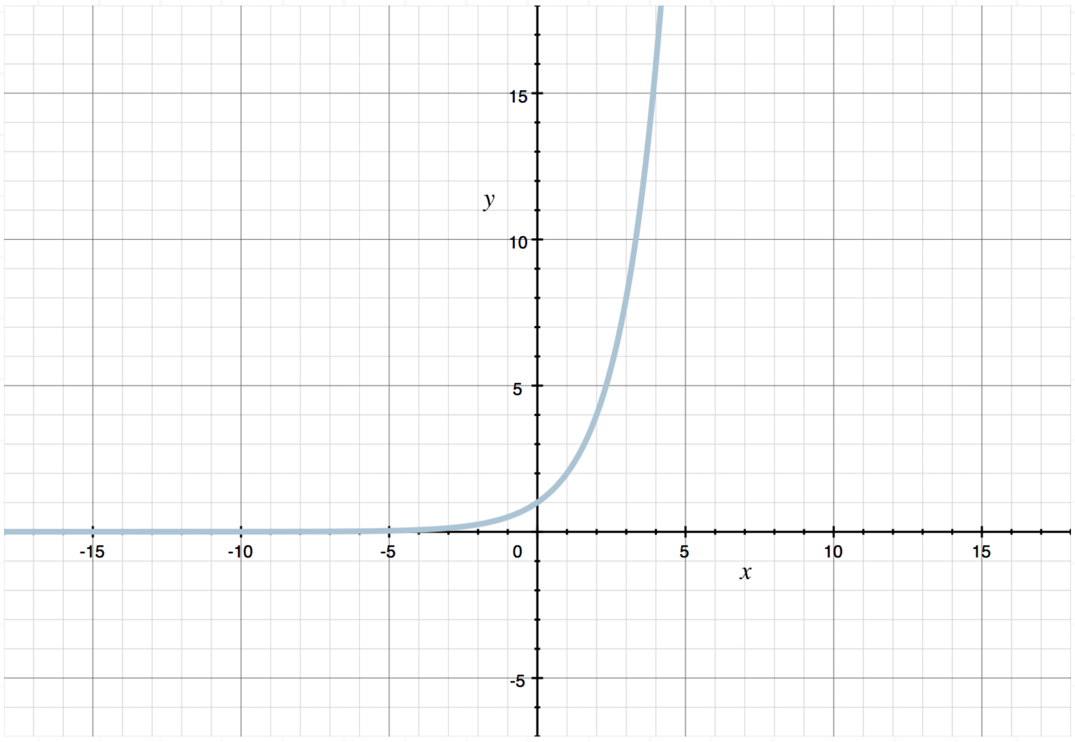

We can see that these new points are mirror images of the original points with respect to the line $y = x$, which confirms that the functions are inverses of each other.




Connect the new points with an exponential curve that reflects the given logarithmic curve with respect to the line $y = x$.




This is the graph of the inverse function.



y
15
10
5
-5
-15
-10
-5
0
5
10
15
x