

Ch 8 Hand-in key first part 2022

Thursday, June 1, 2023 10:32 PM



C_19 Ch 8 Hand-in 2022 with Natural Log

Chapter 8 Hand-in Assignment – Logarithms

Name: Key

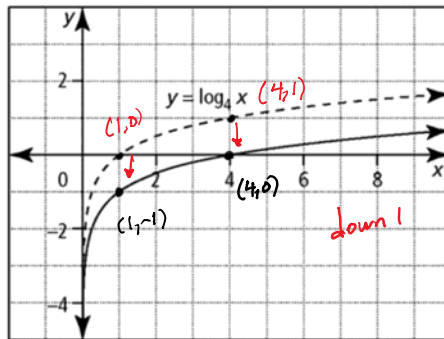
1. Describe how the graph of each logarithmic function can be obtained from the graph of $y = \log_2 x$.

a) $y = \log_2(-5(x+4)) - 1$ reflect across y-axis
 HC by $\frac{1}{5}$
 4 left
 1 down

b) $y = 2\log_2(x-7) + 4$ VE by 2
 7 right
 4 up

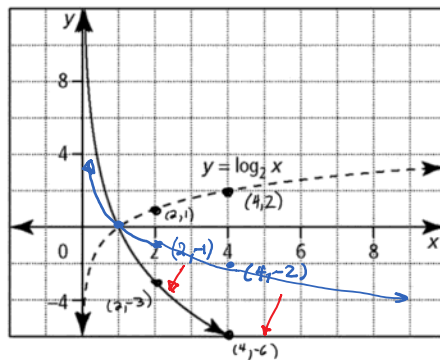
2. For each graph, the solid curve is a transformation of the dashed curve. Write the equation of each solid graph.

a)



$$y = \log_4(x) - 1$$

b)



reflect across x-axis

VE by 3

$$y = -3\log_2(x)$$

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$$y = -2 \log_2(x+4) - 1$$

3. Given the base function $y = \log_2 x$ and its transformed function, $y = -2 \log_2(x+4) - 1$ do the following:

- List the transformations that will occur and give the mapping notation

VE 2
reflect across x-axis
4 left
1 down

$$(x, y) \rightarrow (x-4, -2y-1)$$

- Complete the tables, showing 5 key points for each table. Include mapping notation on the table heading.

$y = \log_2 x$ original

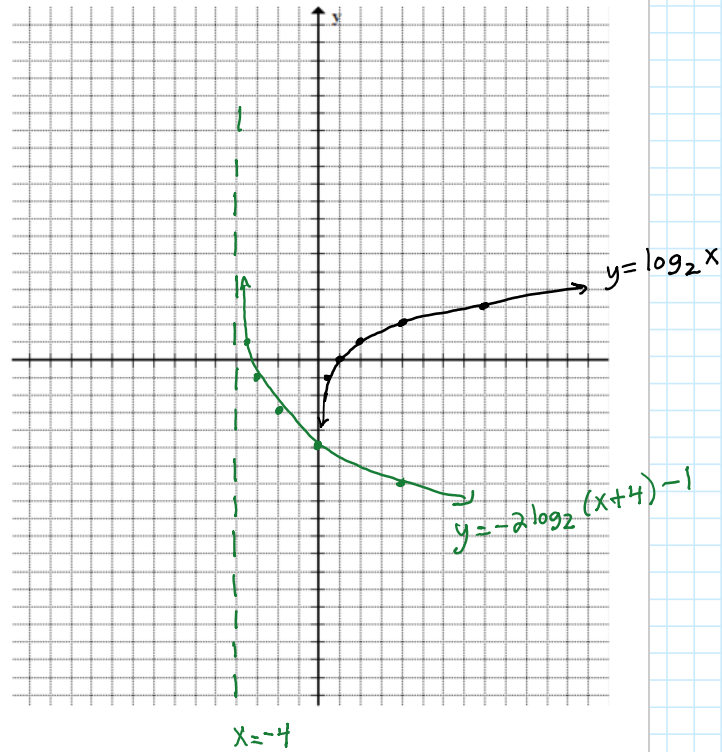
x	y
1/2	-1
1	0
2	1
4	2
8	3

$y = \log_2(1/2)$
 $y = \log_2 1$
 $y = \log_2 2$
 $y = \log_2 4$
 $y = \log_2 8$

Choose powers of 2

$y = -2 \log_2(x+4) - 1$

x-4	-2y-1
-3 1/2	1
-3	-1
-2	-3
0	-5
4	-7



- On the provided grid, sketch and label the original and transformed graphs.
- For the transformed function, give
 - Domain $\{x | x > -4, x \in \mathbb{R}\}$
 - Range $\{y | y \in \mathbb{R}\}$
 - The equation of its asymptote $x = -4$
 - The coordinates of its x-intercept and y-intercept

x-int
let $y = 0$

$$0 = -2 \log_2(x+4) - 1$$

$$\frac{1}{-2} = \frac{-2 \log_2(x+4)}{-2}$$

$$-\frac{1}{2} = \log_2(x+4)$$

change form } $2^{-1/2} = x+4$

$$2^{-1/2} - 4 = x$$

$$x = \frac{1}{\sqrt{2}} - 4 \approx -3.29$$

$$\left(\frac{1}{\sqrt{2}} - 4, 0\right) \approx (-3.29, 0)$$

y-int
let $x = 0$

$$y = -2 \log_2(0+4) - 1$$

$$y = -2 \log_2(4) - 1$$

$$y = -2(2) - 1$$

$$y = -4 - 1$$

$$y = -5$$

$$(0, -5)$$

4. The graph of $y = \log_3 x$ has been transformed as described below. Give the equation of each transformed function:

- a) $y = \log_3 x$ is expanded vertically by a factor of 4, expanded horizontally by a factor of 3, reflected across the y -axis, and is translated 2 left and 5 down.

$$y = 4 \log_3 \left(-\frac{1}{3}(x+2) \right) - 5$$

- b) $y = \log_3 x$ is compressed vertically by a factor of $\frac{1}{2}$, stretched horizontally by a factor of 8, reflected across the x -axis, and is translated 3 right and 6 up.

$$y = -\frac{1}{2} \log_3 \left(\frac{1}{8}(x-3) \right) + 6$$

5. Write in logarithmic form.

a) $4^{-2} = 0.0625$

$$\log_4 (0.0625) = -2$$

b) $5^3 = r+6$

$$\log_5 (r+6) = 3$$

c) $e^x = 8$

$$\ln 8 = x$$

6. Write in exponential form.

a) $\log_2 512 = 9$

$$2^9 = 512$$

b) $\ln(16) = t$

$$e^t = 16$$

c) $\log_2 (a-4) = b$

$$2^b = a-4$$

7. Use the definition of logarithms to find the value of each expression below.

a) $\log_3 81 = \boxed{4}$
(since $3^4 = 81$)

b) $\log_4 \left(\frac{1}{64} \right) = \log_4 \left(\frac{1}{4^3} \right)$
 $= \log_4 (4^{-3}) = \boxed{-3}$

8. Solve the following equations for x . If answer is not exact, give it correct to **2 decimal places**.

a) $\log_4 (x-8) = 5$

change form } $4^5 = x-8$
 $1024 = x-8$

$$\boxed{x = 1032}$$

b) $\log_x (18) = \frac{3}{4}$

change form } $x^{3/4} = 18$

raise both sides to reciprocal exponent

$$\left(x^{3/4} \right)^{4/3} = \left(18 \right)^{4/3}$$

$$x = 18^{4/3}$$

$$x = \sqrt[3]{18^4}$$

$$\boxed{x = 47.17}$$

c) $\ln(x) + \ln(8) = \ln 32$

d) $\log_6 (3x^7) - \log_6 (x^6) = 2$