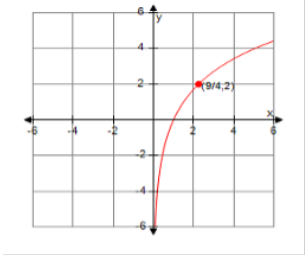
Your Name: Solutions

ID #:

Worksheet: Graphs of logarithmic functions

1. Find the function $f(x) = log_a x$ whose graph is given.



A. $f(x) = \log_{\frac{\sqrt{2}}{3}} x$

B. $f(x) = \log_{\frac{2}{3}} x$

C. $f(x) = \log_{\frac{3}{2}} x$ ✓

D. $f(x) = \log_{\frac{\sqrt{3}}{2}} x$

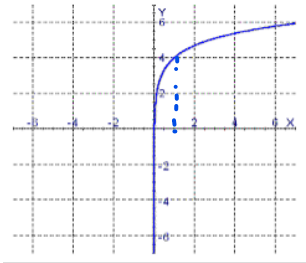
E. none of these

$\log_{\frac{3}{2}} \frac{9}{4} = \log_{\frac{3}{2}} \left(\frac{3}{2}\right)^2 = 2$

2. Identify the logarithmic function corresponding to the graph.

$\ln x$ passes $(1,0)$

the graph passes $(1,4)$



A. $f(x) = \ln(4 + x)$

B. $f(x) = \ln(x) + 4$ ✓

C. $f(x) = \ln(x) - 4$

D. $f(x) = \ln(4 - x)$

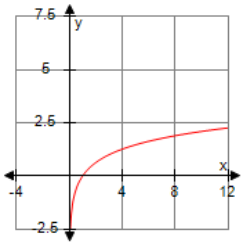
E. none of these

3. Identify the graph of the function $y = \log_3(x - 3) - 1$ using the graph of $y = \log_3 x$ shown in then leftmost below.

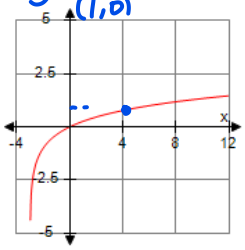
$\log_3 x$ $\xrightarrow{\text{shift right 3 units}}$ $\log_3(x-3)$ $\xrightarrow{\text{down 1 unit}}$ $\log_3(x-3) - 1$

(1,0) (4,0) (4,−1)

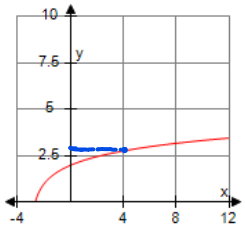
→ asm: $x = 3$



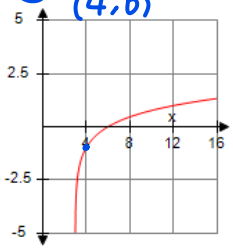
$(y = \log_3 x)$



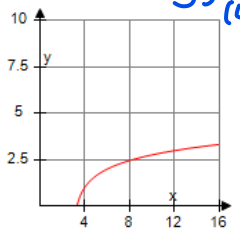
(A)



(B)



(C) ✓

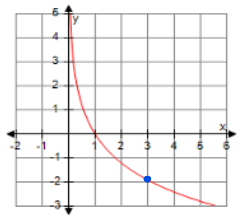


(D)

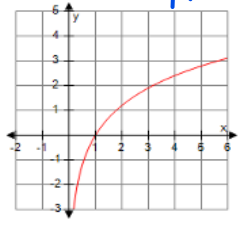
4. Determine the graph of the function $f(x) = -4 \ln x$

$4 \ln x$ $\xrightarrow{\text{reflect about } x\text{-axis}}$ $-4 \ln x$

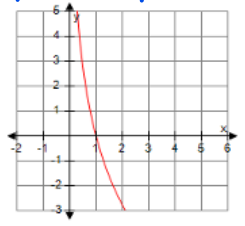
$f(3) = -4 \ln 3 < -4$



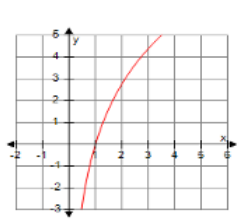
(A)



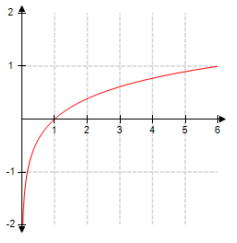
(B) ✗



(C) ✓

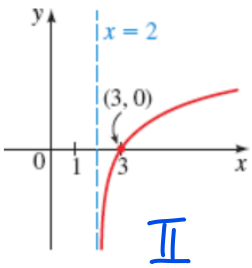


(D) ✗

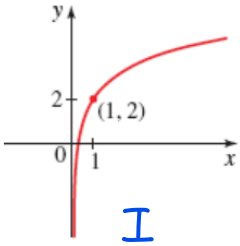


(E) ✗

5. Match the logarithmic function with one of the graphs labeled I or II.



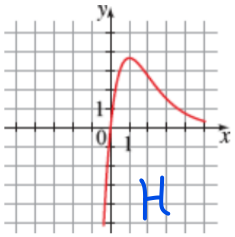
II

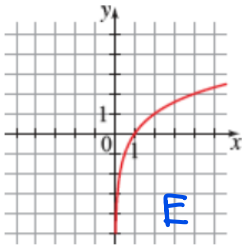


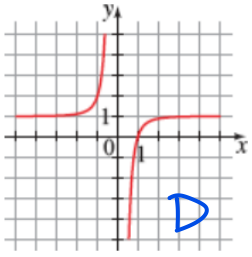
I

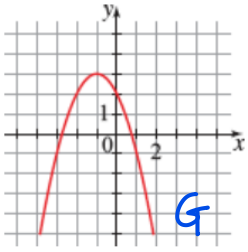
I. $f(x) = 2 + \ln x$
II. $f(x) = \ln(x - 2)$

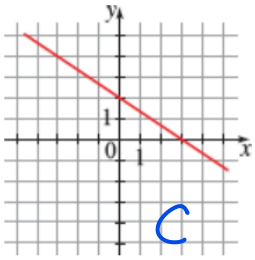
6. Match the functions with graphs

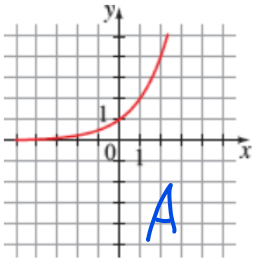


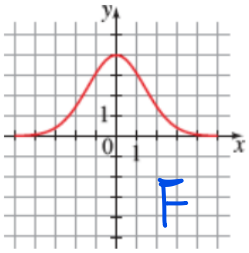


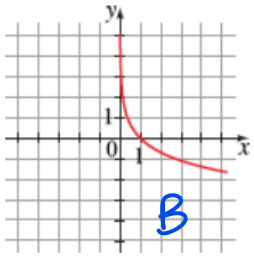






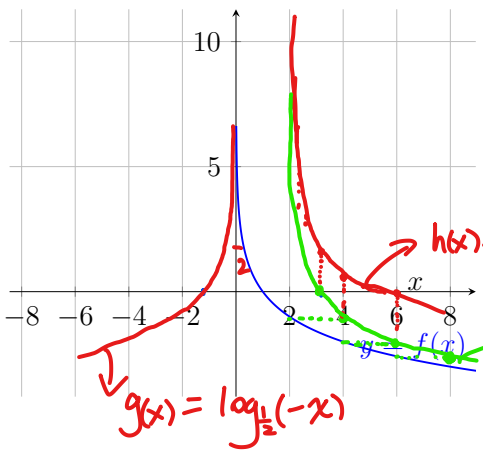






A. $y = 2^x$
B. $y = -\ln x$
C. $2x + 3y = 6$
D. $y = 1 - \frac{1}{x^3}$
E. $y = \log_2 x$
F. $y = 4e^{-\frac{x^2}{4}}$ even
G. $y = 2 - 2x - x^2$
H. $y = 10xe^{-x}$

7. Based on the given graph of $f(x) = \log_{\frac{1}{2}} x$, graph $g(x) = ~~f(x)~~ = \log_{\frac{1}{2}}(-x)$ and $h(x) = \log_{\frac{1}{2}}(x - 2) + 2$



1). $\log_{\frac{1}{2}} x$ reflect about y-axis → $\log_{\frac{1}{2}}(-x)$ (-1, 0)

2) $\log_{\frac{1}{2}} x$ right 2 units → $\log_{\frac{1}{2}}(x-2)$: (3, 0)

up 2 units → $\log_{\frac{1}{2}}(x-2) + 2$ (3, 2)