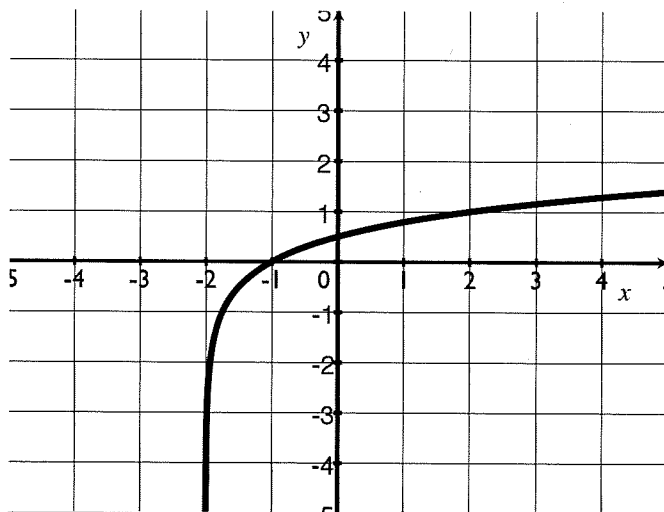


# Quiz 4

Key

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [3] (LogFunctionWks #4) Let the graph to the right be the  $g(x)$ . Given that  $g(x)$  is an logarithmic function of the form  $y = \log_b(x)$  that has been horizontally shifted. Find the equation.



shifted left 2 units  $\Rightarrow \log_b(x+2)$

passes thru (2,1) so

$$\left. \begin{aligned} 1 &= \log_b(2+2) \\ 1 &= \log_b(4) \\ b^1 &= 4 \end{aligned} \right\} \textcircled{+1}$$

So  $y = \log_4(x+2)$

form  $\textcircled{+5}$

$\textcircled{+5}$  Horiz shift 2 so of the form  $y = \log_b(x+h)$   
 passes thru (-1,0) so  $0 = \log_b(-1+h)$   
 or  $\textcircled{+5} \rightarrow b^0 = -1+h \Rightarrow 1 = -1+h \Rightarrow h=2$

$\textcircled{+5}$  passes thru (2,1) so  $1 = \log_b(2+2)$   
 $\textcircled{+5} \rightarrow b = 4$  (same steps on left)

2. [2] (WebHW17 #12) Simplify

neg exp  $\textcircled{+1}$   $\textcircled{+5}$  each  
 pairs of 2  $\textcircled{+5}$   
 powers of x  $\textcircled{+5}$

$$\begin{aligned} \frac{2x^{-4}}{2^{-1}x} &= \frac{2 \frac{1}{x^4}}{\frac{1}{2}x} = \frac{\left(\frac{2}{x^4}\right)}{\left(\frac{x}{2}\right)} \\ &= \frac{2}{x^4} \div \frac{x}{2} \\ &= \frac{2}{x^4} \cdot \frac{2}{x} \\ &= \frac{4}{x^5} \end{aligned}$$

$$\begin{aligned} \frac{2x^{-4}}{2^{-1}x} &= \frac{2 \cdot 2^1}{x^4 x} \quad \text{or} \quad \frac{2^1 x^{-4}}{2^{-1} x^1} = 2^{1-(-1)} x^{-4-1} \\ &= \frac{4}{x^5} \quad \text{or} \quad = 2^2 x^{-5} \\ &= 4x^{-5} \end{aligned}$$

3. [2] (§3.2 #95) How long would it take to double your money if you invested  $P$  dollars at the rate of 8% compounded continuously?

(1.5) @ time  $t = Pe^{rt}$

(1.5) start with  $P$ , so double is  $2P$

$$\frac{2P}{P} = \frac{Pe^{.08t}}{P}$$

$$2 = e^{.08t}$$

$$\ln 2 = \ln e^{.08t} \Rightarrow \ln 2 = .08t$$

$$\Rightarrow t = \frac{\ln 2}{.08}$$

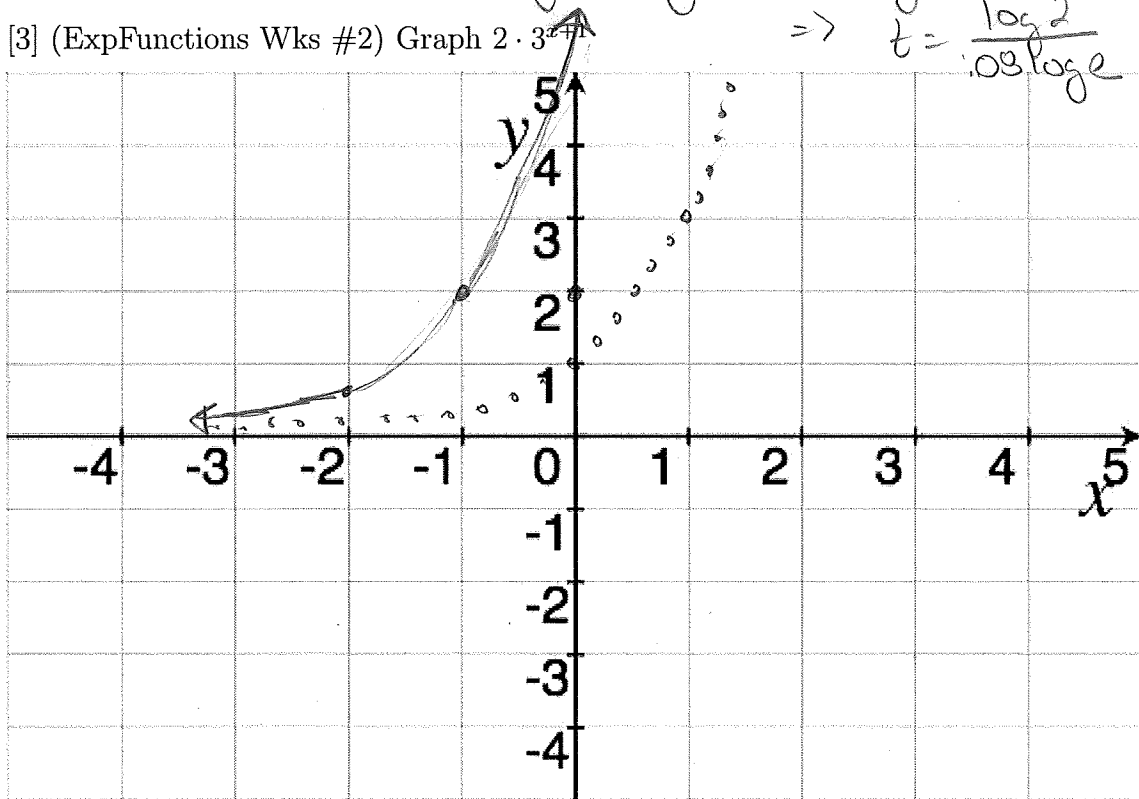
def of log  $\ln 2 = .08t \Rightarrow t = \frac{\ln 2}{.08}$

use log (1.5)  
alg/got (1.5)

$$\log 2 = \log e^{.08t} \Rightarrow \log 2 = .08t \log e$$

$$\Rightarrow t = \frac{\log 2}{.08 \log e}$$

4. [3] (ExpFunctions Wks #2) Graph  $2 \cdot 3^{x+1}$



Graph of  $3^x = y$  is dotted

shape (1)

$2 \cdot 3^{x+1}$   
 ↑  
 vertical stretch/mult  $y$  value by 2 (1)  
 ↑  
 horiz shift left by 1 unit (1)