Quiz 4

Key

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

1. Let $f(x) = x^{-\frac{2}{5}}$. The graph of f is given below.

   (a) [2] (§3.1 #27)Find a formula for the inverse function f^{-1}, if it exists.

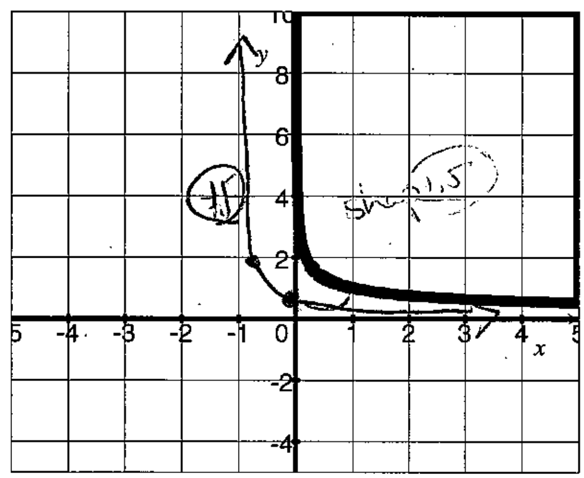
   note, f passes the horz line test so f^{-1} exists

   $x = y^{-2/5}$ (+1)

   raise both sides to the $-5/2$ (+.5) legal

   $x^{-5/2} = \left(y^{-2/5}\right)^{-5/2}$

   $x^{-9/2} = y^{-2/5 \cdot -5/2} = y$ (+.5) $f^{-1}(x) = x^{-9/2}$



   (b) [2] (§3.1 #59) Carefully sketch the graph of $f(x+1)$.

   horz shift (+.5) to the left (+.5)

2. [2] (Web7 #11) Rewrite the expression as a single logarithm:

$$\ln 8 + 2\ln x + 2\ln(x^2+3)$$

(+1)

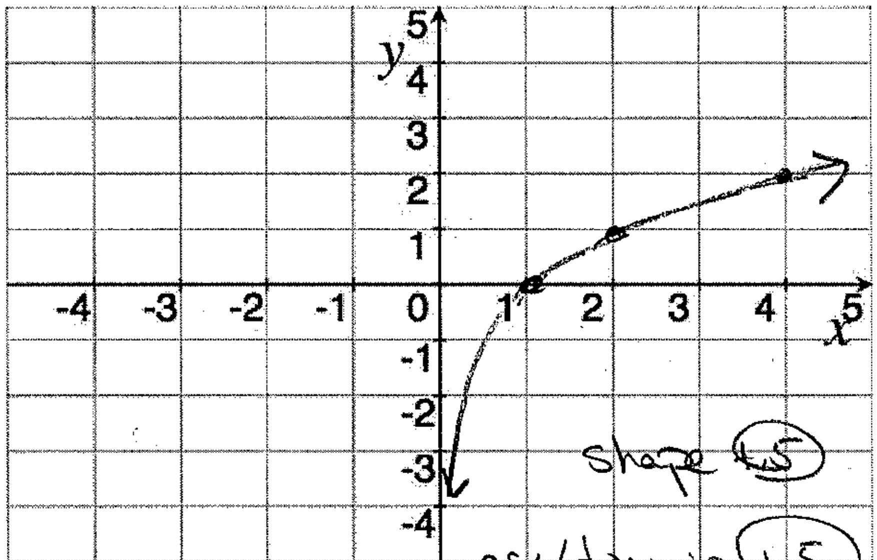
b/c $k\ln v = \ln v^k$ (+1) $\quad \ln 8 + \ln x^2 + \ln(x^2+3)^2$

b/c $\ln uv = \ln u + \ln v$ (+1) $\quad \ln 8x^2 + \ln(x^2+3)^2$

$\ln\left[8x^2(x^2+3)^2\right]$

3. Let $g(x) = \log_2 x$.

(a) [1] (pg 239) *Carefully* draw the graph of g on the set of axes below.



x	$\log_2 x$
0	not def
1	0
2	1
4	2

shape +.5

asy/domain +.5

(b) [1](§3.2 #63) ~~Find $g(13)$ exactly~~. Show work.
Find a decimal approx. for $g(13)$

$g(13) = \log_2(13) = \dfrac{\log 13}{\log 2} \approx 3.7$ .5

+.5

(c) [2] (§3.2 #47) If g has an inverse, find it. If g does not, explain why not.

g does have an inverse b/c the graph of g passes the horz. line test.

$y = \log_2 x$

Step 1+2 $\quad x = \log_2 y$ (+1)

Step 3 $\quad$ solve for y

+.5 legal

$2^x = \cancel{2^{\log_2}} y$

$2^x = y$ $\quad$ so $g^{-1}(x) = 2^x$ +.5