Spring '10

Quiz 4

Key

1. [2] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let x be a real number and u and v be positive real numbers.

   T (F) $|x| = x$ for all x $\quad |-1| \neq -1$ if x is negative

   T (F) $\log(u+v) = \log(u) + \log(v)$ $\quad \ln(u)+\ln(v) = \ln(u \cdot v)$

   (T) F $\log_b(a) = x$ exactly when $b^x = a$

   T (F) $\log(u-v) = \frac{\log(u)}{\log(v)}$

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

2. [3] (§3.3 # 35) Find all numbers x that satisfy

$$\log_3(x+5) + \log_3(x-1) = 2$$

$3^{\log_3(x+5)(x-1)} = 3^2$ prop of logs (+1) started (+.5)

$(x+5)(x-1) = 9$

$x^2 + 5x - x - 5 = 9$

$x^2 + 4x - 14 = 0$ alg after no logs (+1)

$x = \dfrac{-4 \pm \sqrt{16 - 4(1)(-14)}}{2 \cdot (1)}$ check domain (+.5)

$= \dfrac{-4 \pm \sqrt{16+56}}{2}$

$= \dfrac{-4 \pm \sqrt{72}}{2}$ b/c domain

$= \dfrac{-4 \pm 2\sqrt{18}}{2}$ $x = -2 + \sqrt{18}$

$= -2 \pm \sqrt{18}$

14 4 56

72 1 a 8 1 4 2

3. Find a formula for the inverse function f^{-1} of the indicated function:

(a) [2] (§3.1 #29) $f(x) = 6 + x^3$

$x = 6 + y^3$ (+1)

$x - 6 = y^3$

$(x-6)^{\frac{1}{3}} = y$ (+1)

(b) [3] (§3.2 #49) $f(x) = \log_4(3x + 1)$

$4^x = 4^{\log_4(3y+1)}$ (+1)

Prop of logs (+1)

$4^x = 3y + 1$

$4^x - 1 = 3y$

$\frac{4^x - 1}{3} = y$ (+1)