Name: KEY Date: _____

Math 1050 PRACTICE Quiz (Ch. 6)

Questions 1-3 are all or nothing. On questions 1-3, work is not necessary.

1. (3 points) Jerico wants to triple his initial investment of $1000. His account offers 3.5% annual interest, **compounded monthly**. Set up an equation that enables Jerico to calculate how many years it will take for his investment to triple. **Do not solve.**

$$3000 = 1000\left(1+\frac{0.035}{12}\right)^{12t}$$

2. (3 points) If $\log_b\sqrt{x} = 2$, evaluate $\log_b x$.

$\log_b(x)^{1/2} = 2$

$2 \cdot \frac{1}{2}\log_b(x) = 2 \cdot 2$

$\log_b x = 4$

3. (3 points) f is a one-to-one function defined by: $\left\{\left(5,\frac{1}{9}\right),(-2,9),(9,-1),(-9,4),\left(\frac{1}{9},3\right)\right\}$. Find $f^{-1}(9)$.

$f^{-1}(9) = -2$

4. (7 points) Solve $2\ln(x) = \ln(14-5x)$. **No points will be awarded if the solution is found by trial and error.**

$\ln(x)^2 = \ln(14-5x)$

$x^2 = 14-5x$

$x^2+5x-14 = 0$

$(x+7)(x-2) = 0$

$x+7=0$ $\quad x-2=0$

$-7\ -7 \quad +2\ +2$

$x=-7 \quad \boxed{x=2}$

↑ extraneous

Domain:

$14-5x>0$

$-14 \quad -14$

$-5x > -14$

$\frac{-5x}{-5} < \frac{-14}{-5}$

$x < 2.8$

and $x > 0$

so $0 < x < 2.8$

5. (7 points) Let $f(x) = 3x - 1$ and $g(x) = \frac{2}{2x+1}$.

(a) Find $f \circ g$ and simplify completely.

$$fog = f(g(x)) = f\left(\frac{2}{2x+1}\right) = 3\left(\frac{2}{2x+1}\right) - 1$$

$$\rightarrow \frac{6}{2x+1} - 1 = \frac{6}{2x+1} - \frac{2x+1}{2x+1} = \frac{6-(2x+1)}{2x+1} = \frac{-2x+5}{2x+1}$$

$$fog = \frac{-2x+5}{2x+1}$$

(b) What is the domain of $f \circ g$? (Based on $g(x)$ & fog)

$$\{x \mid x \neq -\tfrac{1}{2}\}$$

6. (7 points) A certain type of bacteria, given a favorite growth medium, doubles in population every 4 hours. ($N(t) = N_0 e^{kt}$). Given that there were 125 bacteria to start with, how many bacteria will there be in 72 hours?

$N(4) = 2N_0$

$t = 4$

① Find k:

$$\frac{2N_0}{N_0} = \frac{N_0 e^{k(4)}}{N_0}$$

$$2 = e^{4k}$$

$$\frac{\ln(2)}{4} = \frac{4k}{4}$$

$$k = 0.173286795$$

② $N(72) = 125e^{0.173286795(72)}$

$N(72) = 32,768,000$

32,768,000 bacteria