Math 1050 Section 3
Lynn Lindsay
Chapter 4 Exam Form A
DO NOT WRITE ON THIS EXAM!

Directions: Put your name on each piece of scratch paper that you use. Turn in your scratch paper along with your answer sheet when you finish the exam. Do each problem in order on your scratch paper showing all the steps of your solution. Put your final answer neatly on the answer sheet. Remember to check your answers to insure a good score. Use your calculator to check your answer. Good luck, your preparation will pay off!

1. The one-to-one function f is defined by $f(x)=\dfrac{-8x+5}{7x+2}$.

Find f^{-1}, the inverse of f. Then, give the domain and range of f^{-1} using interval notation.

2. Graph the exponential function $f(x)=-2^{x}$.

3. An initial amount of money is placed in an account at an interest rate of 4% per year, compounded continuously. After two years, there is \$2231.57 in the account. Find the initial amount placed in the account. Round your answer to the nearest cent.

4. Solve for x. $13^{-6x}=3^{x+5}$ Write the exact answer using base-10 logarithms.

5. Solve for x. $4\log_4(4x)=8$

6. A loan of \$39,000 is made at 5% interest, compounded annually. After how many years will the amount due reach \$63,000 or more? (Use the calculator provided if necessary.)

Write the answer as a whole number.

7. Write the expression as a single logarithm. $4\log_4 y-\dfrac{1}{5}\log_4 z+5\log_4 w$

8. Graph the following function. $g(x)=\dfrac{2}{3}e^{x-2}+2$

9. Evaluate: $\log_5\dfrac{1}{25}$.

10. For each pair of functions f and g below, find $f(g(x))$ and $g(f(x))$.
Then, determine whether f and g are inverses of each other.

Simplify your answers as much as possible.
(Assume that your expressions are defined for all x in the domain of the composition.
You do *not* have to indicate the domain.)

11. The number of bacteria in a certain population increases according to an exponential *growth* model, with a growth rate of 3.5% per hour. How many hours does it take for the size of the sample to double?

Do not round any intermediate computations, and round your answer to the nearest hundredth.

12. A species of fish was added to a lake. The population size $P(t)$ of this species can be modeled by the following exponential function, where t is the number of years from the time the species was added to the lake.

$$P(t) = \frac{1200}{1+3e^{-0.3t}}$$

Find the initial population size of the species and the population size after 7 years. Round your answers to the nearest whole number as necessary.

13. Graph $f(x) = 4\log_3 x$.

14. The one-to-one functions g and h are defined as follows.

$$g = \{(-9,5),(1,6),(7,4),(8,1)\}$$

$$h(x) = 3x+14$$

Find the following.

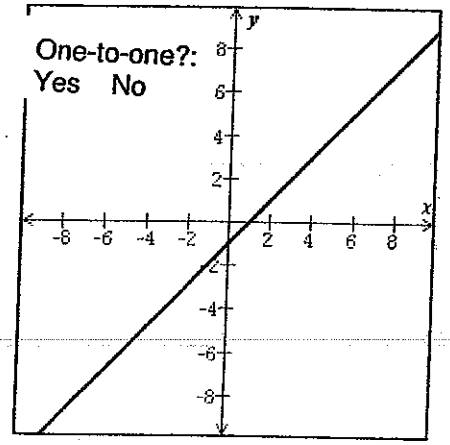
$g^{-1}(1)$	=
$h^{-1}(x)$	=
$(h^{-1} \circ h)(-3)$	=

15. Solve for x. $2^{x^2+18x-18} = 32^{3x-4}$

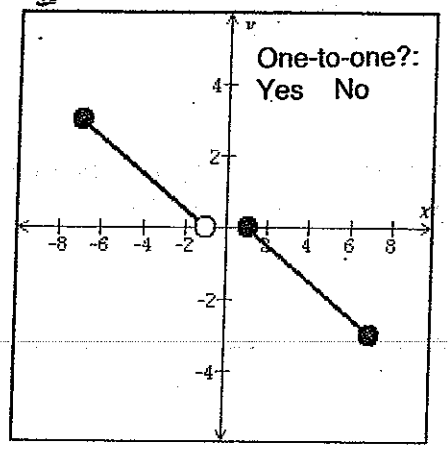
16. Find the domain of the function. $f(x) = \log_4(x^2-9)$ Write your answer as an interval or union of intervals.

17. For each function graphed below, state whether it is one-to-one.

A



B



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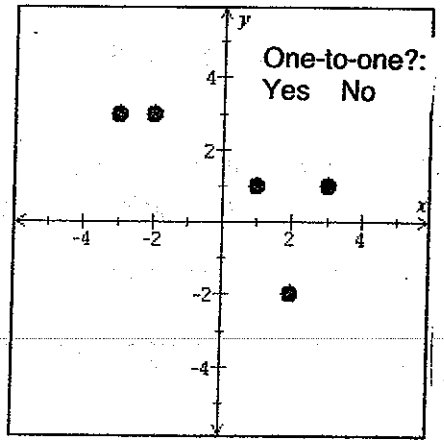

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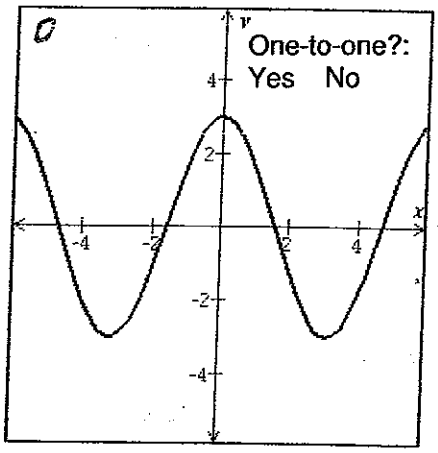

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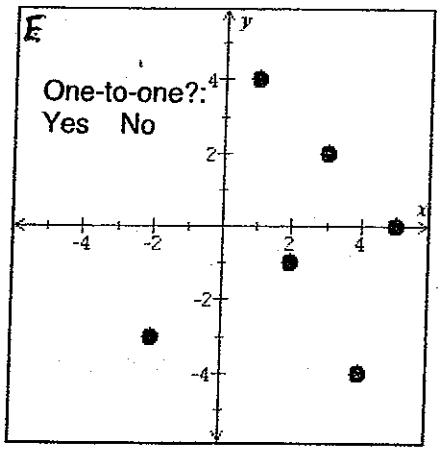

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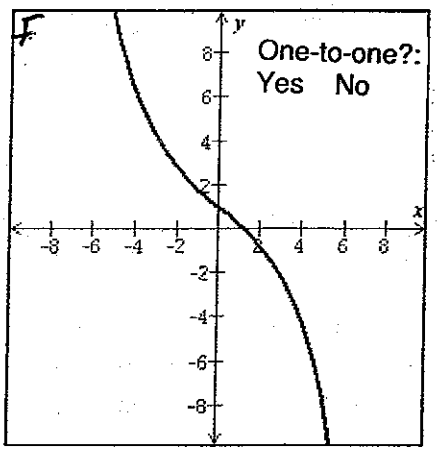

18. Use the properties of logarithms to expand $\log\left(y^4 z\right)$.

Each logarithm in your answer should involve only one variable.
Assume that all variables are positive.

19. The one-to-one function f is defined $f(x) = (x-4)^3$

Find f^{-1}, the inverse of f. Then give the domain of f^{-1} using interval notation.

20. Graph the function $g(x) = \log_3(x+2) - 1$ and give its domain and range using interval notation.

21. Rewrite as a logarithmic equation. $8^{-1} = \frac{1}{8}$

22. Frank borrowed $\$8000$ at a rate of 15%, compounded semiannually. Assuming he makes no payments, how much will he owe after 3 years?

Do not round any intermediate computations, and round your answer to the nearest cent.

23. A certain forest covers an area of 1800km^2. Suppose that each year this area decreases by 5%. What will the area be after 11 years? Round your answer to the nearest square kilometer.

24. Donna deposits $\$400$ into an account that pays simple interest at a rate of 4% per year. How much interest will she be paid in the first 5 years?

25. A species of animal is discovered on an island. Suppose that the population size $P(t)$ of the species can be modeled by the following exponential function, where time t is measured in years.

$$P(t) = \frac{340}{1+7e^{-0.2t}}$$

Find the initial population size of the species and the population size after 8 years. Round your answers to the nearest whole number as necessary.