

Math 1050 Section 3

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Chapter 4 Exam Form B

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. 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.)

2. Graph the exponential function $f(x) = -\left(\frac{3}{2}\right)^x$.

3. Solve for x .

$$25^{x+5} = 5^{4x}$$

4. Rewrite as a logarithmic equation.

$$2^{-2} = \frac{1}{4}$$

5. An initial amount of money is placed in an account at an interest rate of 2% per year, compounded continuously. After six years, there is \$2097.14 in the account. Find the initial amount placed in the account. Round your answer to the nearest cent.

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

$$g = \{(-9, 4), (4, 5), (5, -5), (7, -3)\}$$

$$h(x) = 2x + 13$$

Find the following.

$g^{-1}(4) =$
$h^{-1}(x) =$
$(h \circ h^{-1})(5) =$

7. Find the domain of the function. $f(x) = \log_2(x^2 - 4)$

Write your answer as an interval or union of intervals.

8. An amount of \$39,000 is borrowed for 7 years at 8.25% interest, compounded annually. If the loan is paid in full at the end of that period, how much must be paid back? Round your answer to the nearest dollar.

9. Use the properties of logarithms to expand $\log(y^8 z)$.

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

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

11. 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.

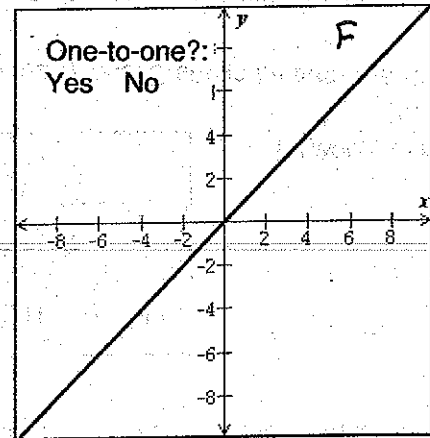
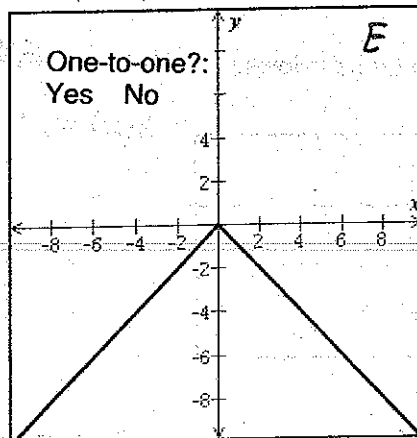
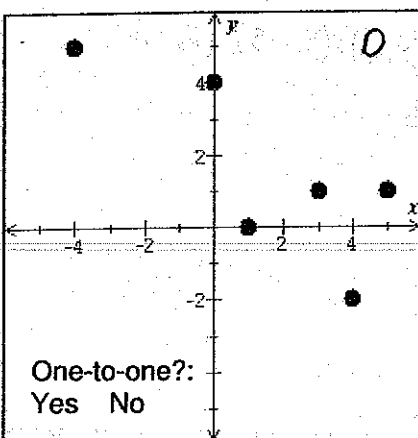
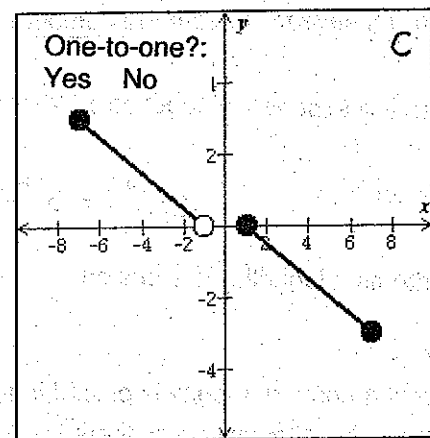
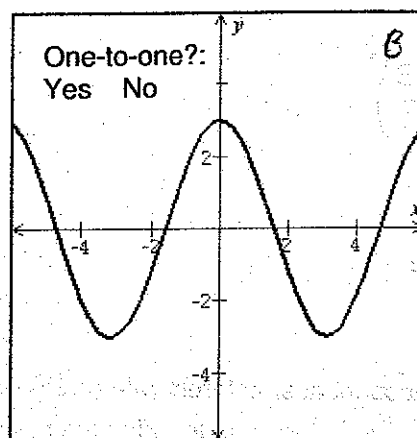
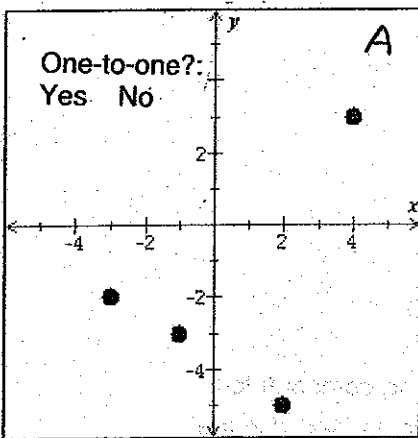
$$P(t) = \frac{1500}{1 + 2e^{-0.1t}}$$

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.

12. The one-to-one function f is defined by $f(x) = \frac{-7x}{2x-3}$.

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

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



14. Solve for x . $2^{x-9} = 13^{5x}$ Write the exact answer using base-10 logarithms.

15. A can of soda is placed inside a cooler. As the soda cools, its temperature $T(x)$ in degrees Celsius is given by the following exponential function, where x is the number of minutes since the can was placed in the cooler.

$$T(x) = -18 + 40e^{-0.03x}$$

Find the initial temperature of the soda and its temperature after 18 minutes. Round your answers to the nearest degree as necessary.

16. A loan of \$46,000 is made at 4.25% interest, compounded annually. After how many years will the amount due reach \$78,000 or more? (Use the calculator provided if necessary.)

Write the answer as a whole number.

17. Tammy deposited \$4000 into an account with 3% interest, compounded semiannually. Assuming that no withdrawals are made, how much will she have in the account after 10 years?

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

18. Solve for x : $5 + \log_4(x+8) = 6$

19. Graph the function $g(x) = -1 + \log_4(x+2)$ and give its domain and range using interval notation.

20. Suppose that the number of bacteria in a certain population increases according to an exponential *growth* model. A sample of 2400 bacteria selected from this population reached the size of 2555 bacteria in two and a half hours. Find the continuous growth rate per hour.

Write your answer as a percentage. Do not round any intermediate computations, and round your percentage to the nearest hundredth.

21. Write the expression as a single logarithm. $7\log_8 x - \frac{1}{5}\log_8 y + 3\log_8 w$

22. Joe deposits \$8000 into an account that pays simple interest at a rate of 4% per year. How much interest will he be paid in the first 5 years?

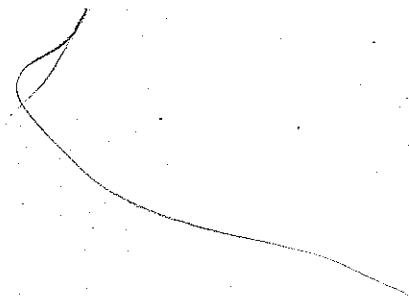
23. Evaluate: $\log_2 \frac{1}{4}$.

24. Graph $f(x) = 3\log_2 x$.

25. The one-to-one function f is defined below.

$$f(x) = (x-9)^3$$

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



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