

Math 124: Algebra with Applications
Spring 2019
Exam 4 Practice Problems

Name (Print): _____

- For each function, find the specified values of the function.

1. Let $f(x) = 3^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 3$
2. Let $f(x) = 2^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 2$
3. Let $f(x) = 4^x$. Find $f(2)$ and $f(-1)$. Answer: $f(2) = 16, f(-1) = \frac{1}{4}$
4. Let $f(x) = 3^{-x}$. Find $f(2)$ and $f(4)$. Answer: $f(2) = \frac{1}{9}, f(4) = \frac{1}{81}$
5. Let $f(x) = 7^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 7$
6. Let $g(x) = (.5)^x$. Find $g(0)$ and $g(1)$. Answer: $g(0) = 1, g(1) = \frac{1}{2}$
7. Let $f(x) = 8^x$. Find $f(1)$ and $f(-2)$. Answer: $f(1) = 8, f(-2) = \frac{1}{64}$
8. Let $f(x) = 5^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 5$
9. Let $f(x) = (2.5)^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 2.5$
10. Let $f(x) = (.3)^x$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = .3$
11. Let $f(x) = 3^{.5x}$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = \sqrt{3}$
12. Let $f(x) = 16^{x/2}$. Find $f(0)$ and $f(1)$. Answer: $f(0) = 1, f(1) = 4$

- Translate each logarithmic statement into an equivalent exponential statement.

1. $\log(100) = 2$ Answer: $10^2 = 100$
2. $\log_6(216) = 3$ Answer: $6^3 = 216$
3. $\log_5(25) = 2$ Answer: $5^2 = 25$
4. $\log(100000) = 5$ Answer: $10^5 = 100000$
5. $\log(100) = 2$ Answer: $10^2 = 100$
6. $\log_2(8) = 3$ Answer: $2^3 = 8$
7. $\log_6(1296) = 4$ Answer: $6^4 = 1296$
8. $\log(10000) = 4$ Answer: $10^4 = 10000$
9. $\log_2(\frac{1}{16}) = -4$ Answer: $2^{-4} = \frac{1}{16}$
10. $\log_4(64) = 3$ Answer: $4^3 = 64$

- Evaluate each expression.

1. $\log_7(49)$ Answer: 2
2. $\log_5(\frac{1}{25})$ Answer: -2
3. $\log_8(\frac{1}{2})$ Answer: $-\frac{1}{3}$
4. $\log(.001)$ Answer: -3
5. $\ln(\sqrt{e})$ Answer: $\frac{1}{2}$
6. $\log_7(7^{3.84})$ Answer: 3.84

- Solve each problem.

1. Suppose you deposit \$700 in a savings account with an interest rate of 3% compounded quarterly. How much is in the account after 2 years, after 7 years, and after 16 years?
Answer: $A(2) = \$743.12$, $A(7) = \$862.90$, $A(16) = \$1129.23$
2. In assembly line operations, it is found that a worker who is new to the job will produce $P(t)$ items on day t , where $P(t) = 50 - 50e^{-.5t}$. How many items will be produced on the first day? How many items will be produced on the fifth day? According to the function, what is the maximum number of items the worker can produce?
Answer: First day - 19 complete items. Fifth day - 45 complete items. Maximum - 50 items.
3. Suppose you owe \$3500 on a credit card. To pay it off, you don't make any new purchases on it and each month you make a payment that is slightly more than the monthly interest, so that the remaining balance on the card after t months is given by $B(t) = 3500(.9898)^t$. What is the balance after 3 months? What is the balance after 6 years? What is the balance after 11 years?
Answer: $B(3) = \$3393.99$, $B(72) = \$1672.96$, $B(132) = \$904.34$
4. You place \$10,000 into an account that compounds interest continuously at an annual interest rate of 5%. How long will it take until the account has \$20,000?
Answer: 13.86 years
5. A \$1000 investment is made with an annual interest rate of 12% compounded monthly. How long until you reach \$2000?
Answer: 5.805 years

- Solve each equation. You may round answers to 3 decimal places.

1. $\ln(x + 5) = \ln(2x - 15)$ Answer: $x = 20$
2. $e^{-2x} = 10$ Answer: $x = -1.151$
3. $\ln(2x + 6) = \ln(x + 12)$ Answer: $x = 6$
4. $4^{x+2} = 16$ Answer: $x = 0$
5. $\log_7(70x - 7) = 3$ Answer: $x = 50$
6. $4^{3x-8} = 64$ Answer: $x = \frac{11}{3}$
7. $\ln(x + 2) = \ln(2x - 3)$ Answer: $x = 5$
8. $5^{x-1} = 25$ Answer: $x = 3$
9. $\log_3(5x - 1) = \log_3(x + 7)$ Answer: $x = 2$
10. $10^{1-x} = 10^4$ Answer: $x = -3$
11. $\log_4(6x - 2) = 3$ Answer: $x = 11$
12. $25^x = 625$ Answer: $x = 2$
13. $\ln(2x + 5) = 1 + \ln(x - 2)$ Answer: $x = 14.53$
14. $4^{-2x} = 10^{x-1}$ Answer: $x = 0.454$
15. $\ln(x - 7) = \ln(5x + 11)$ Answer: no solution
16. $7^x = 5$ Answer: $x = 0.827$
17. $\ln(6x + 3) = \ln(3) + \ln(x + 4)$ Answer: $x = 3$
18. $4^x = 9$ Answer: $x = 1.585$
19. $\log_2(3x - 1) = 2$ Answer: $x = \frac{5}{3}$
20. $\left(\frac{2}{3}\right)^x = \frac{9}{4}$ Answer: $x = -2$
21. $\ln(x + 4) = \ln(3x + 1)$ Answer: $x = \frac{3}{2}$
22. $3^{x+5} = 17$ Answer: $x = -2.421$
23. $\log_8(x + 4) = 2 - \log_8(2x)$ Answer: $x = 4$
24. $12^{x-2} = 144$ Answer: $x = 4$
25. $\ln(8x + 2) = \ln(3x - 5)$ Answer: no solution
26. $9^{2-x} = 81^{x+4}$ Answer: $x = -2$