

Unit 5 Test Review

Find the inverse of each function.

1) $y = \log_4(x) - 4$

$y = 4^{x+4}$

2) $y = \log_3(x-2)$

$y = 3^x + 2$

3) $y = \log_5(x+1)$

$y = 5^x - 1$

4) $y = \log_6(x) + 7$

$y = 6^{x-7}$

5) $y = \log_4(x-8) - 1$

$y = 4^{x+1} + 8$

6) $y = \log_2(x+2) - 3$

$y = 2^{x+3} - 2$

7) $y = \log_3(x+7) + 8$

$y = 3^{x-8} - 7$

8) $y = \log_5(x+8) - 6$

$y = 5^{x+6} - 8$

9) $y = \log_6(x+4) + 3$

$y = 6^{x-3} - 4$

10) $y = \log_2(x-1) - 10$

$y = 2^{x+10} + 1$

11) $y = 4^x + 9$

$y = \log_4(x-9)$

12) $y = 2^x + 12$

$y = \log_2(x-12)$

13) $y = 3^{x-4} + 1$

$y = \log_3(x-1) + 4$

14) $y = 6^{x+9} - 3$

$y = \log_6(x+3) - 9$

15) $y = 14^x - 3$

$y = \log_{14}(x+3)$

16) $y = 6^{x-5}$

$y = \log_6(x) + 5$

17) $y = 8^{x-2}$

$y = \log_8(x) + 2$

18) $y = 9^{x+3} + 2$

$y = \log_9(x-2) - 3$

19) $y = 3^{x-5} - 7$

$y = \log_3(x+7) + 5$

20) $y = 4^{x-1} + 5$

$y = \log_4(x-5) + 1$

21. In the year 1989, the tuition at a private college was \$18,000. During the next 9 years, tuition increased by about 5.5% each year.

- a. Write a model giving the cost C of tuition at the college t years after 1989.

$$A = 18000(1 + 0.055)^t$$

- b. What was the tuition in 2005?

$$A = 18000(1 + 0.055)^{16} = \$42394.73$$

- c. What year was the tuition \$27,000? Give the answer to 3 decimal places.

$$\frac{27000}{18000} = \frac{18000}{18000}(1 + 0.055)^t$$

$$1.5 = (1.055)^t$$

$$\log_{1.055}(1.5) = t$$

$$t = \frac{\log 1.5}{\log 1.055}$$

$$t = 7.573 \text{ years}$$

22. You purchase a stereo system for \$1000. The value of the stereo system decreases 8% each year.

- a. Write an exponential decay model for the value of the stereo system in terms of the number of years since the purchase.

$$A = 1000(1 - 0.08)^t$$

- b. What is the value of the system after 2 years?

$$A = 1000(1 - 0.08)^2 = \$846.40$$

- c. When will the stereo be worth half the original value?

$$\frac{500}{1000} = \frac{1000}{1000}(1 - 0.08)^t$$

$$0.5 = (.92)^t$$

$$\log_{.92}(0.5) = t$$

$$t = \frac{\log .5}{\log .92}$$

$$t = 8.313 \text{ years}$$

23. You deposit \$3,000 in a savings account. The savings account earns 4% interest for 5 years.

What is the balance in the account if the interest is compounded:

a. Semi-annually

$$A = 3000\left(1 + \frac{.04}{2}\right)^{2 \cdot 5} = \$3656.98$$

b. Quarterly

$$A = 3000\left(1 + \frac{.04}{4}\right)^{4 \cdot 5} = \$3660.57$$

c. Monthly

$$A = 3000\left(1 + \frac{.04}{12}\right)^{12 \cdot 5} = \$3662.99$$

d. Continuously

$$A = 3000e^{.04(5)} = \$3664.21$$

$$A = 3000\left(1 + \frac{.04}{n}\right)^{5n}$$

24. You purchase a car for \$12,000. The value of the car decreases 15.2% each year.

- a. Write an exponential decay model for the value of the car in terms of the number of years since the purchase.

$$A = 12000(1 - .152)^t$$

- b. What is the value of the car after 2 years?

$$A = 12000(1 - .152)^2 = \$8629.25$$

- c. What is the value of the car after 5 years?

$$A = 12000(1 - .152)^5 = \$5262.12$$