

Name _____

Solve.

1) $5^x = 625$

2) $4^x = 256$

3) $3^x = \frac{1}{9}$

4) $\frac{1}{16} = 2^{-x}$

5) $\left(\frac{1}{5}\right)^x = 125$

6) $81^x = 3$

7) $3^{12-4x} = 81$

8) $4^5 + 3^x = \frac{1}{256}$

9) $100,000^x - 2 = 10,000^x$

10) $6 \cdot 3^x = 3^x + 1$ (Round to the nearest thousandth.)

11) $(16)^{x+1} = \left(\frac{2}{4}\right)^{x-1}$

12) $4^x = \frac{1}{256}$

13) $\frac{1}{625} = 5^{-x}$

14) $\left(\frac{1}{2}\right)^x = 16$

15) $256^x = 4$

16) $2^8 - 2^x = 16$

17) $4^7 + 3^x = \frac{1}{16}$

18) $100^x - 10 = 1000^x$

19) $8 \cdot 2^x = 4^x + 1$ (Round to the nearest thousandth.)

20) $\left(\frac{25}{9}\right)^{x+1} = \left(\frac{3}{5}\right)^{x-1}$

Solve the problem.

- 21) A computer is purchased for \$4900. Its value each year is about 76% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function

$$V(t) = 4900(0.76)^t$$

Find the value of the computer after 9 years.

- 22) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 7500(3)^x$, where x is time in days. Find the number of bacteria after 2 days. What was the initial number of bacteria in the incubation culture?

- 23) The half-life of a certain radioactive substance is 19 years. Suppose that at time $t = 0$, there are 29 g of the substance. Then after t years, the number of grams of the substance remaining will be

$$N(t) = 29 \left(\frac{1}{2} \right)^{t/38}$$

How many grams of the substance (to the nearest tenth of a gram) will remain after 76 years?

- 24) Sun Woo Kim invested \$2000 at 4% compounded monthly. How much will be in the account in 10 years? (Round to the nearest cent.)

- 25) The number of books in a small library increases according to the function $B = 2700e^{0.05t}$, where t is measured in years. How many books will the library have after 6 years?

- 26) How long will it take a sample of radioactive substance to decay to half of its original amount, if it decays according to the function $A(t) = 600e^{-0.069t}$, where t is the time in years? (Round to the nearest hundredth year.)

- 27) The population of a particular city is increasing at a rate proportional to its size. It follows the function $P(t) = 1 + ke^{0.08t}$ where k is a constant and t is the time in years. If the current population is 37,000, in how many years is the population expected to be 92,500? (Round to the nearest year.)

- 28) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 2700(5)^x$, where x is time in days. Find the number of bacteria after 3 days. What was the initial number of bacteria in the incubation culture?

- 29) The half-life of a certain radioactive substance is 8 years. Suppose that at time $t = 0$, there are 28 g of the substance. Then after t years, the number of grams of the substance remaining will be

$$N(t) = 28 \left(\frac{1}{2} \right)^{t/16}$$

How many grams of the substance (to the nearest tenth of a gram) will remain after 24 years?

- 30) Susan Johnson invested \$3000 at 6% compounded quarterly. How much will be in the account in 3 years? (Round to the nearest cent.)

- 31) The number of books in a small library increases according to the function $B = 4000e^{0.03t}$, where t is measured in years. How many books will the library have after 7 years?

Answer Key

Testname: WS8.4V03

- 1) 4
- 2) 4
- 3) -2
- 4) 4
- 5) -3
- 6) $\frac{1}{4}$
- 7) 2
- 8) -3
- 9) 10
- 10) 0.257
- 11) $-\frac{3}{5}$
- 12) -4
- 13) 4
- 14) -4
- 15) $\frac{1}{4}$
- 16) 2
- 17) -3
- 18) - 20
- 19) 0.500
- 20) $-\frac{1}{3}$
- 21) \$414.49
- 22) 67,500; 7500
- 23) 7.3 g
- 24) \$2981.67
- 25) 3645
- 26) 10.05 yr
- 27) 11 yr
- 28) 337,500; 2700
- 29) 9.9 g
- 30) \$3586.85
- 31) 4935