Alg 2 Chapter 6 Review   Spring 2020

Round to the nearest hundredth unless noted otherwise or the situation dictates so.

1. Write each in logarithmic form.
a) $5^3 = x$ b) $x^7 = 72$ c) $4^x = 100$ d) $e^5 = x$ e) $10^x = 211$

2. Write each in exponential form.
a) $\log_3 x = 20$ b) $\log 478 = x$ c) $\ln x = 50$ d) $\log_x 8 = 3$

3. The value of a rare painting has been increasing 13% each year.
In 2005 the painting was worth $35,000.
a) Find the value of the painting in 1990.
b) Find the value of the painting in 2011.
c) In how many years will the painting be worth $1,000,000?

4. The population of a city in 1978 was 900,000 and has been decreasing 5.9% each year.
a) Find the population in 1975.
b) Find the popution in 1999.
c) In how many years will the population reach 100,000?

5. Use all three properties of logs to write each as a single log and for part (c) then evaluate.
a) $3\log_2 W + \log_2 X - \frac{1}{2}\log_2 M$ b) $\frac{3}{2}\log C - 2(\log D + \frac{1}{5}\log E)$
c) $4\log_6 3 + 2\log_6 8 - 2\log_6 12$

6. Use all three properties of logarithms to expand each as much as possible.
a) $\log\left(\dfrac{5E}{Q^4}\right)$ b) $\ln(AC^3)^4$ c) $\log\dfrac{\sqrt[3]{K}}{N^6 R}$

Solve each equation.   Round decimal answers to the nearest thousandth.
7. $7^x = 100$

8. $5^{2x} = 42$ 9. $4(6)^{x-3} = 194$ 10. $\log_x 40 = 2$

11. $\log_3 X + \log_3 (X - 24) = 4$ 12. $\log_4 (x + 7)^2 = 3$

13. $\log X - \log(X - 6) = 3$ 14. $\log_4 6 + 2\log_4 X = 2$

15. $5e^{2x} - 9 = 20$ 16. $2\ln x + 1 = 8$

17. $\ln(x + 1) = 5 + \ln(x - 2)$ 18. $3^{x+2} = 2^{x-4}$

19. $9^{x+3} = 27^{2x}$ 20. $\ln(x^2 - 3) = \ln(x + 9)$

21. $2\log_3 (x + 3) = \log_3 (4x + 24)$

22. Write the equation of the exponential function $(y = a \cdot b^2)$ that passes through these two points: $(2, 12)$ & $(5, 768)$

23. Use these formulas: $y = P(1 + \frac{r}{n})^{nt}$ $y = Pe^{rt}$
You invest $8000 in an account that pays 3% annual interest. Find the amount of money in the account at the end of 25 years if interest is calculated the following ways:
a) Compounded quarterly.   b) Compounded annually.   c) Compounded continuously

24. The half-life of a radioactive substance is 45 minutes. There is 800 grams of this substance at 10:00 am. Find the amount remaing at 2:20pm the same day.

25. The number of cells doubles every 18 minutes. There are 25 cells at 1:00pm. Find the number of cells at 3:45pm the same day.

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1. a) $\log_5 x = 3$ b) $\log_x 72 = 7$ c) $\log_4 100 = x$ d) $\ln x = 5$ e) $\log 211 = x$

2. a) $3^{20} = x$ b) $10^x = 478$ c) $e^{50} = x$ d) $x^3 = 8$

3. EQ: $y = 35,000(1.13)^x$ a) \$5596.18   b) \$72,868.31   c) 27.43 yrs

4. EQ: $y = 900,000(.941)^x$ a) 1,080,124   b) 250,971   c) 36.13 yrs

5. a) $\log\left(\dfrac{W^3 X}{\sqrt{M}}\right)$ b) $\log\left(\dfrac{\sqrt{C^3}}{D^2 \sqrt[3]{E^2}}\right)$ c) $\log_6 36 = 2$

6. a) $\log 5 + \log E - 4\log Q$ b) $4(\ln A + 3\ln C)$ or $4\ln A + 12\ln C$
   c) $\frac{1}{3}\log K - 6\log N - \log R$

7. $x = 2.37$ 8. $x = 1.161$ 9. $x = 5.166$ 10. $x = 6.325$

11. $x = 27$ 12. $x = -15, 1$ 13. $x = 6.006$ 14. $x = 1.633$

15. $x = 0.879$ 16. $x = 33.115$ 17. $x = 2.020$ 18. $x = -12.26$

19. $x = 1.5$ 20. $x =, 4, -3$ 21. $x = 3$ (−5 is an extraneous solution)
22. $y = 0.75(4)^x$
23. a) \$16,888.67   b) \$16,750.22   c) \$16,936.00
24. 14.58 grams   25. 14,368 cells