Bellwork Alg 2B Wednesday, November 1, 2017

1. Find the growth/decay factor, b, using each % change.

a) 72% increase b) 0.081% increase

2. State the % change each equation represents and whether it's an increase or decrease

a) $y = 36(1.04)^x$ b) $y = 1.39(0.627)^x$

3. Write each in exponential form

a) $\log 6 = x$ b) $\ln x = 3$

4. Write each in logarithmic form

a) $x^4 = 8$ b) $9^{1.5} = x$

5. Evaluate each logarithm without a calculator.

a) $\log_{25} 5$ b) $\log_2(0.25)$ c) $\log_6 1$ d) $\log_3 3$ e) $\log 10{,}000$

6. Write as a single logarithm. $-3\log_4 A - 5\left(\log_4 \frac{1}{D^2} - \frac{1}{4}\log_4 W\right)$

7. Expand using the properties of logarithms. $\log \sqrt{\frac{G^6 \sqrt[4]{\frac{1}{H^3}}}{M^5}}$

8. Write as a single logarithm then evaluate.

$\frac{1}{2}\log_2 81 - \log_2 24 - \log_2 6$

9. The value of an investment has depreciated 4.5% each year. The investment was worth $400,000 in 2016.

a) Find the value of the investment in 2010.

b) In how many years, to the nearest hundredth, will the value of the investment be $150,000?

10. The number of cells of a bacteria doubles every 45 minutes. There are 80 cells at 5:00 am. Find the number of cells at 10:20 am the same day.

11. Solve each to the nearest hundredth.

a) $5e^{3x-5} + 2 = 100$ b) $7^{2x} - 4 = 50$

Bellwork Alg 2B Wednesday, November 1, 2017 Answers

1. Find the growth/decay factor, b, using each % change.

a) 72% increase

100 + 72 = 172 %

$b = 1.72$

b) 0.081% increase

100 + 0.081 = 100.081 %

$b = 1.00081$

2. State the % change each equation represents and whether it's an increase or decrease

a) $y = 36(1.04)^x$

×100

104 %

4 % increase

b) $y = 1.39(0.627)^x$

×100

62.7 %

37.3 % decrease

3. Write each in exponential form

a) $\log 6 = x$ $10^x = 6$

b) $\ln x = 3$ $e^3 = x$

4. Write each in logarithmic form

a) $x^4 = 8$ $\log_x 8 = 4$

b) $9^{1.5} = x$ $\log_9 x = 1.5$

5. Evaluate each logarithm without a calculator.

a) $\log_{25} 5$ $25^? = 5$ $\frac{1}{2}$

b) $\log_2 (0.25)$ $2^? = \frac{1}{4}$ -2

c) $\log_6 1$ $6^? = 1$ 0

d) $\log_3 3$ $3^? = 3$ 1

e) $\log 10{,}000$ $10^? = 10{,}000$ 4

6. Write as a single logarithm. $-3\log_4 A - 5\left(\log_4 \frac{1}{D^2} - \frac{1}{4}\log_4 W\right)$

$-3\log_4 A - 5\log_4 D^{-2} - \frac{5}{4}\log_4 W$

$-\log_4 A^3 - \log_4 D^{-10} + \log_4 W^{5/4}$

$= \log_4 \frac{1 \sqrt[4]{W^5}}{A^3 D^{-10}}$

$= \log_4 \frac{D^{10} \sqrt[4]{W^5}}{A^3}$

7. Expand using the properties of logarithms. $\log \sqrt{\frac{G^6 \sqrt[4]{\frac{1}{H^3}}}{M^5}}$

$= \log \left(\frac{G^6 H^{-3/4}}{m^5}\right)^{1/2}$

$= \log \left(\frac{G^3 H^{-3/8}}{m^{5/2}}\right)$

$= 3\log G - \frac{3}{8}\log H - \frac{5}{2}\log m$

8. Write as a single logarithm then evaluate.

$\frac{1}{2}\log_2 81 - \log_2 24 - \log_2 6$

$= \log_2 \sqrt{81} - \log_2 24 - \log_2 6 = \log_2 \frac{9}{24 \cdot 6} = \log_2 \frac{9}{144}$

$= \log_2 \frac{1}{16} \Rightarrow 2^? = \frac{1}{16}$

$= -4$

9. The value of an investment has depreciated 4.5% each year. The investment was worth $400,000 in 2016.

$100 - 4.5 = 95.5\%$

a) Find the value of the investment in 2010.

$400{,}000\,(.955)^x$ x = # yrs since 2016

$x = -6$

$\$527{,}278.13$

b) In how many years, to the nearest hundredth, will the value of the investment be $150,000?

$\frac{150{,}000}{400{,}000} = \frac{400{,}000(.955)^x}{400{,}000}$

$.375 = (.955)^x$

$\log_{.955}(.375) = x$

$x = \frac{\log(.375)}{\log(.955)}$

$x = 21.30$ yrs

10. The number of cells of a bacteria doubles every 45 minutes. There are 80 cells at 5:00 am. Find the number of cells at 10:20 am the same day.

5:00 am to 10:20 am

= 5 hrs 20 min

= 320 min

$x = 320/45$

$80(2)^x$ x = # 45 min periods

$= 80(2)^{320/45}$

$= 11{,}060$ cells

11. Solve each to the nearest hundredth.

a) $5e^{3x-5} + 2 = 100$

$-2 \quad -2$

$\frac{5e^{3x-5}}{5} = \frac{98}{5}$

$e^{3x-5} = 19.6$

$\ln 19.6 = 3x - 5$

$x = 2.66$

b) $7^{2x} - 4 = 50$

$+4 \quad +4$

$7^{2x} = 54$

$\log_7 54 = 2x$

$\frac{\log 54}{\log 7} = 2x$

$x = 1.02$