Bellwork Alg 2B Monday, November 13, 2017

Solve each. Round to the nearest hundredth.

1. $8 \cdot 4^{2x-1} + 3 = 50$

2. $\ln(x+7) - \ln(x-4) = 3$

3. $\log_6(x-5)^2 = 3$

4. Use all three properties of logarithms to write this expression as a single logarithm

$4\left(\frac{1}{3}\log A - 2(\log B - 3\log C) - 5\log D\right)$

5. Use all three properties of logarithms to expand this expression as much as possible

$\ln\sqrt{\left(\frac{\sqrt[5]{P}}{Q^6R^7}\right)^3}$

6. The half-life of a certain medicine is 35 minutes. At 4:00pm there was 212 mg of this medicine in your system. Find the amount of medicine in your system at the given times, the same day, to the nearest hundredth of a mg.

a) 7:20 pm

b) 11:33 am

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ANSWERS

Solve each. Round to the nearest hundredth.

1. $8 \cdot 4^{2x-1} + 3 = 50$

$-3 \quad -3$

$\frac{8 \cdot 4^{2x-1}}{8} = \frac{47}{8}$

$4^{2x-1} = \frac{47}{8}$

$\log_4 \frac{47}{8} = 2x-1$

$x = \frac{\log_4 \frac{47}{8} + 1}{2}$

$x = 1.14$

2. $\ln(x+7) - \ln(x-4) = 3$

$\ln \frac{x+7}{x-4} = 3$

$e^3 = \frac{x+7}{x-4}$

$e^3(x-4) = x+7$

$e^3 x - 4e^3 = x+7$

$e^3 x - x = 7 + 4e^3$

$\frac{x(e^3-1)}{e^3-1} = \frac{7+4e^3}{e^3-1}$

$x = 4.58$

3. $\log_6(x-5)^2 = 3$

$6^3 = (x-5)^2$

$\pm\sqrt{216} = x-5$

$x = 5 \pm \sqrt{216} = 19.70, -9.70$

4. Use all three properties of logarithms to write this expression as a single logarithm

$4\left(\frac{1}{3}\log A - 2(\log B - 3\log C) - 5\log D\right)$

$= 4\left(\frac{1}{3}\log A - 2\log B + 6\log C - 5\log D\right)$

$= \frac{4}{3}\log A - 8\log B + 24\log C - 20\log D$

$= \log \frac{\sqrt[3]{A^4} \cdot C^{24}}{B^8 \cdot D^{20}}$

5. Use all three properties of logarithms to expand this expression as much as possible

$\ln\sqrt{\left(\frac{\sqrt[5]{P}}{Q^6R^7}\right)^3} = \ln\left[\left(\frac{P^{1/5}}{Q^6R^7}\right)^3\right]^{1/2} = \ln\left(\frac{P^{1/5}}{Q^6R^7}\right)^{3/2}$

$= \frac{3}{2}\ln\left(\frac{P^{1/5}}{Q^6R^7}\right) = \frac{3}{2}\left(\ln P^{1/5} - \ln Q^6 - \ln R^7\right)$

$= 3/2\left(\frac{1}{5}\ln P - 6\ln Q - 7\ln R\right) = \frac{3}{10}\ln P - 9\ln Q - \frac{21}{2}\ln R$

6. The half-life of a certain medicine is 35 minutes. At 4:00pm there was 212 mg of this medicine in your system. Find the amount of medicine in your system at the given times, the same day, to the nearest hundredth of a mg.

a) 7:20 pm

TOTAL TIME = 3hr 20min = 200 min

$x = \frac{200}{35}$ $200/35$

$y = 212(.5)$

$= 4.04$ mg

b) 11:33 am

$y = 212(.5)^x$

$x =$ # 35 min periods

TOTAL TIME = 4hr 27min = 267 min in the past

$x = -267/35$

$y = 212(.5)^{-267/35} =$

41,953.16 mg