## Unit 10 Day 8 HW

Wednesday Test

Do Warm-up in Notes

Wednesday Test

(1) x = .5(2) x = 2.71(3)  $3 \ln x - 2$ (2) x = 2.71(7)  $\ln \frac{x^4}{\sqrt[3]{y}}$ (8)  $\ln \frac{x^2\sqrt{y}}{z\omega^3}$ (9) x = 1.91(1) x = .5(8)  $\ln \frac{x^2\sqrt{y}}{z\omega^3}$ (9) x = 1.91(10) x = 1.91(11) x = .5(12) x = 1.91(13) x = 1.91(14) x = 1.91(15) x = 1.91(16) x = 1.91(17) x = 1.91(18) x = 1.91(19) x = 1.91

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Name

Alg 2 CC

Unit10 HW Day8

1. Using logarithms, find the value of x to the nearest tenth. X = 0.5

$$\frac{(x+1)\log 7}{\log 7} = \frac{\log 18.6}{\log 7}$$

$$\frac{X+1}{\log 7} = \frac{10918.6}{\log 7}$$

$$\frac{X+1}{x = 1.5022}$$

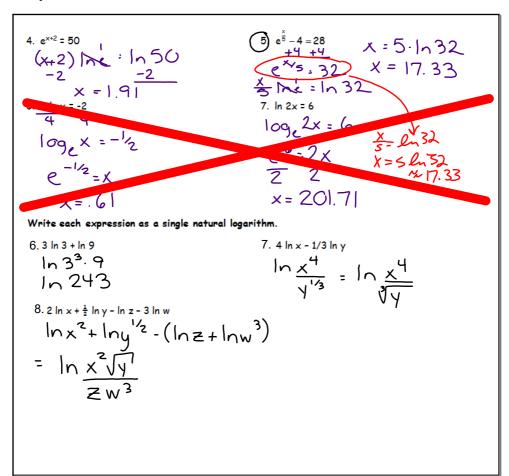
Use natural logarithms to solve each equation. Round your answer to the nearest hundredth.

$$2.e^{x}=15$$
  
 $x = 10 = 10 = 15$   
 $x = 2.71$ 

$$3. \frac{4e^{x}}{4} = \frac{10}{4}$$

$$e^{x} = \frac{5}{2}$$

$$x = 97$$



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## Expand each natural logarithm.

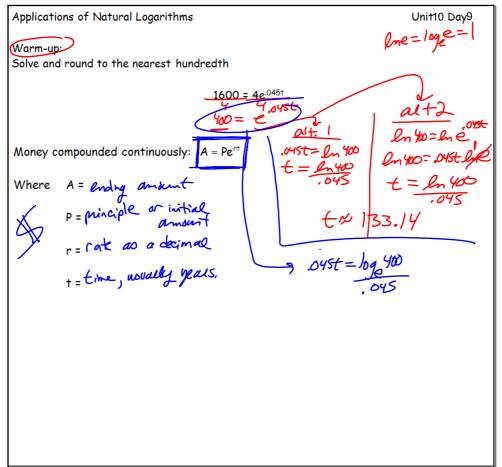
11. 
$$\ln x^3 \sqrt{y}$$
  
=  $3 \ln x + \ln y^{1/2}$   
=  $3 \ln x + \frac{1}{2} \ln y$   
=  $2 \ln a + 3 \ln b - \ln c - \frac{1}{2} \ln d$ 

13. 
$$\ln \frac{x^3}{e^2} = \ln x^3 - \ln e^2$$
  
=  $3 \ln x - 2 \ln e$   
=  $3 \ln x - 2$ 

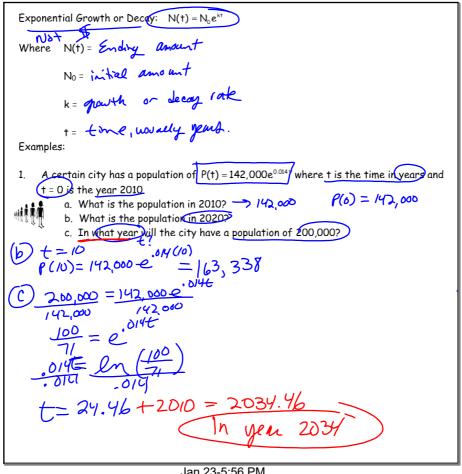
- 14. Biologists are studying a new strain of bacteria. They create a culture in a petri dish with 100 of the bacteria and anticipate that the number of bacteria will double every 30 hours.
  - a. Write an equation for the number of bacteria, B, in terms of the number of hours, t, since the experiment began.
  - b. When will the bacteria, to the nearest hundredth of an hour, reach 1230 in the
  - a. B=100(2) +1/30

b. 
$$\frac{1230}{100} = \frac{100(2)^{t/30}}{100}$$
 $12.3 = (2)^{t/30} \longrightarrow \log 12.3 = \frac{t}{30} \log 2$ 

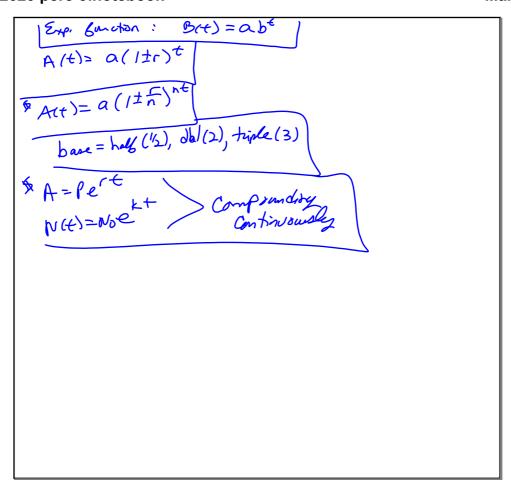
**Applications of Natural Logarithms** 



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- Sam invested a sum of money in a certificate of deposit that pays 8% interest compounded continuously. If he made the investment on January 1, 1997 and the account was worth \$10,000 on January 1, 2016, what was the original amount in the 10,000=Pe .08(19) f=19 = 2016-1997 P= (U.000) = \$2187.12
- 3.) Mike deposited some money in a bank account that earns 5.6% interest compounded continuously. How long will it take to double the money in his account?

  A = 2

  P = 1

  C = .056

  L = 7

  L = 1

  L = 1

  N = 12.35 years

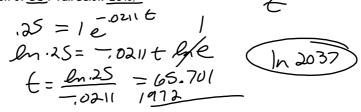
  In the 12th year.

12 years + 138 days

- 4. DDT is an insecticide that has been used by farmers. It decays slowly and is sometimes absorbed by plants that animals and humans eat. DDT absorbed in the mud at the bottom of a lake is degraded into harmless products by bacterial action.

  Experimental data shows that 10% of the initial amount is eliminated in 5 years.

  If k = 0.0211
  - Experimental data shows that 10% of the initial amount is eliminated in 5 years. If k = -0.0211a. How much of the original amount of DDT is left after 10 years?  $N(t) = N_0 = N(t) = N_0 = N$
  - b. The US Environmental Protection Agency banned almost all use of DDT in the US in 1972. If hone has been used near the lake since then, in what year will the concentration of DDT fall below 25%?



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