

Math 162 Test 1

Name _____

1 – 4 Rewrite in equivalent logarithmic form:

1. $10^{-4} = .0001$

2. $(1.08)^t = 2$

3. $e^{-.02t} = 4$

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

5 – 8 Rewrite in equivalent exponential form:

5. $\log_3 81 = 4$

6. $\log(x+1) = 2$

7. $\ln y = x$

8. $\ln(z) + \ln(z-1) = 2$

(Hint: first rewrite as a single logarithm.)

9. Solve for t : $e^{-.02t} = 4$

Round your answer to 3 decimal places.

(Hint: look at your answer to number 3.)

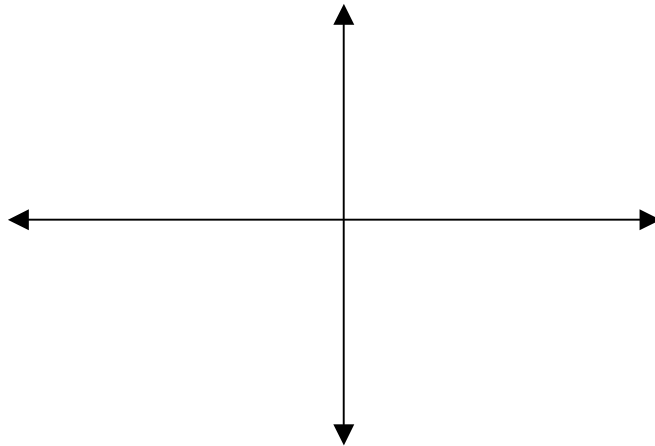
10. Solve for x : $2^x = 200$

Round your answer to 3 decimal places.

11. On January 2000, \$2000 is placed in an Individual Retirement Account (IRA) that will pay 8% per annum compounded **yearly**. What will the IRA be worth in January 2020?

12. How long did it take for the money to double to \$4000?

13. Sketch the graph of $y = e^x$ and $y = \ln x$ on the axis below. State clearly what the domain and range of each are, by filling in the blanks:



14. The domain of the natural log is _____ and the range is _____.

15. The domain of the exponential function is _____ and the range is _____.

16. What is $\ln e^{\sqrt{2}}$? _____

17. Why?

18. Solve for x : $\ln\left(\frac{1}{x}\right) = 2$

19. Solve for x : $\log(4x) - \log(x) = 1.2$ Round your answer to 3 decimal places.

20. If a certain quantity can take on values from .000 000 000 1 to 1,000,000,000 what would the range of the common logarithms (base 10) of such numbers be?

A microbiologist studies a culture of bacteria that starts with a population of 1000. After 5 minutes the population is 1500.

21. Write a model for the population growth $Q(t) = Q_0 e^{kt}$ by using the given information to find Q_0 and k .

22. Using the model, what would the population be after 10 minutes?

23. Extra credit if you have time and have checked all your answers:

Loudness is often measured in decibels. If x is the sound intensity measured in watts per square meter the decibel level is given by $L(x) = 10 \log \frac{x}{I_0}$ where $I_0 = 10^{-12}$ watts per square meter, the least intense sound that a human ear can detect.
In this measurement, how many decibels is the least sound a human ear can detect?

If the intensity is 1,000,000 watts per square meter, what is the decibel level?

If a dripping faucet is 30 decibels, find the sound intensity.