

Advanced Math
Whipple
Exponents and Logarithms Test Practice

Name ks

Date _____

1. Calculate the population of an insect colony of 2000 growing at a rate of 4% per year, 12 years from now.

$$\approx 3202 \text{ insects}$$

2. Calculate the amount of money in a bank account if \$245 was deposited 4 years ago with a 9% interest rate compounded continuously.

$$\$ 351.17$$

3. Calculate the amount money in a bank account 5 years from now if \$100 was deposited with a 14% rate of interest compounded monthly.

$$\$ 200.56$$

Solve each equation

4. $2^{x+2} = \left(\frac{1}{4}\right)^{2-x}$

$$x = 6$$

5. $3\sqrt{81} = 9^{3x}$

$$x = \frac{1}{2}$$

6. A gallon of gasoline cost \$3.27, 2 years ago. Now it costs \$2.07. To the nearest percent, what has been the annual rate of decrease in the cost?

$$r = 20.4\%$$

7. Using your answer from question 8 how long will it take for the price to reach \$1.50, from now?

$$1.41 \text{ years}$$

Re-write as a log or exponential function

8. $3^m = 9$

$$\log_3(9) = m$$

9. $\log_a b = c$

$$a^c = b$$

Find the exact value WITHOUT a calculator. Show Work.

10. $\log_3 27$

$$x = 3$$

11. $\log_{27} 1$

$$x = 0$$

12. $5^{\log_2 64}$

$$5^6$$
$$15625$$

Expand the logarithm

13. $\log_b \sqrt[5]{\frac{M^5}{N^2}}$

$$\log_b(M) - \frac{2}{5} \log_b(N)$$

Express y as a function of x .

14. $\log y = x \log(2)$

$$y = 2^x$$

15. $\log_7 y = \log_7 x - \log_7 4$

$$y = \frac{x}{4}$$

16. Solve $\log_2(x-2) - \log_2(x+5) = 3$

~~$x = 6$~~
no solution

17. Solve $7 \cdot 3^x = 17$ to the nearest thousandths place.

$$x \approx 0.808$$

18. Solve $3e^{4x+5} = 9$ to the nearest thousandths place.

$$x \approx -0.975$$

19. Solve and round to the nearest thousandth.

$$3^{2x+1} - 13 \cdot 3^x = 10$$

$$x \approx 1.465$$

$$3^{2x+1} + 9 = 12 \cdot 3^x$$

$$x = \{1, 0\}$$

21. Bacteria grow at a continuous rate of 5.3% per day. How many days until the amount of bacteria triples in size?

$$t = 21.273 \text{ days}$$

22. At what rate would you invest money so you would increase your investment by 75% in 12 years compounded quarterly?

$$r \approx 4.69\%$$

23. Solve $\frac{3^{x^2}}{27^x} = 9^9$ to the nearest thousandths place.

$$x = \{6, -3\}$$

24. In 1950 the loon population of lake Winnepesaukee was 25. With improved fishing regulations the loon population grew to 500 in 2000. What has been the percent increase of the loon population between 1950 and 2000? If this trend continues, how many loons will inhabit the lake in 2016?

$$\approx 1304 \text{ loons}$$

