

**Section 5 – 7: Calculator Applications**

Name \_\_\_\_\_

Use a calculator to approximate each expression to **two decimal places**.

1.  $\log 4.35$

2.  $\log .067$

3.  $(\log 4.6)^2$

4.  $\frac{1}{\log 2.3}$

5.  $\log \sqrt{5}$

6.  $e^{3.45}$

7.  $e^{.023}$

8.  $e^{-2.45}$

9.  $e^{\sqrt{2}}$

10.  $\ln 12.67$

11.  $\ln 6.19$

12.  $\ln .0045$

13.  $(\ln 9.2)^{-1}$

14.  $\ln (9.2^{-1})$

15.  $\ln (2.5^3)$

16.  $(\ln 2.5)^3$

17.  $10^{3.7}$

18.  $10^{-1.4}$

19.  $10^{\log 3.7}$

20.  $10^{\log .76}$

21.  $\ln (e^8)$

22.  $(\ln e)^8$

22.  $\ln (\ln e)$

24.  $5 \ln (e)$

25.  $e^{\ln 4}$

26.  $e^{3 \ln 2}$

27.  $e^{\ln e}$

28.  $\ln (e^{\ln e})$

Use a calculator to approximate the value for  $x$  to **two decimal places**.

29.  $\log x = 2.45$

30.  $\log x = -2.03$

31.  $-\log x = .0056$

32.  $\ln x = 2.34$

33.  $\ln x = -3.01$

34.  $-\ln x = .47$

$$\text{ph} \approx -\log[\text{H}^+]$$

35. Find the pH of a lemonade drink that has a  $[\text{H}^+]$  concentration of  $9.27 \times 10^{-2}$  moles per liter.

36. Find the pH of a sample taken at a water treatment plant is found to have a  $[\text{H}^+]$  concentration of  $4.1 \times 10^{-7}$  moles per liter.

37. Find the  $[\text{H}^+]$  concentration of a sample taken at a water treatment plant that has a pH of 3.6.

38. Find the  $[\text{H}^+]$  concentration of a sample taken at a water treatment plant that has a pH of 6.1.

$$39. 5^{x+1} = 27$$

$$40. 12^{5x} = 48$$

$$41. 47^{3x+4} = 23$$

$$42. 6^{2x} = .52$$

$$43. 42^{-3x} = 21$$

$$44. 8^{3x-1} = .67$$

$$45. e^{2x} = 27$$

$$46. e^{x-5} = 39$$

$$47. e^{3x-1} = .547$$

$$48. 4e^x = 32$$

$$49. 2e^{3x} = 45$$

$$50. 5e^{x+1} = 42$$

## Growth Rates

A population increase (or decrease) is described by the equation  $A = A_0 e^{rt}$  where  $A_0$  is the initial population,  $A$  is the final population,  $r$  is the the annual growth rate and  $t$  is the time in years.

51. A zoo has 120 penguins. They expect that the number will increase by 8.5% a year. How many penguins will the zoo have in 12 years?
52. A city of 6,000 people expects a growth rate of 8% a year. How many years will it take for the city population to increase to 9,800 people?
53. A company has 45,000 employees at the current time. The company expects to increase that number at a rate of 15% a year. How many years will it take for the company to employ 150,000 people?
54. There are about 5,000 polar bears in the Arctic. Scientists predict a population decrease of 4.9% a year. How many years will it take for the population to decrease to 4,000 people.

## Half Life

$A = A_o(1/2)^{t/h}$   $A_o$  is the original amount of material,  $t$  is the time it decays,  $h$  is the half life of the material and  $A$  is the final amount left of the material.

55. The half live of a radioactive material is 10 years. If you have 2000 grams today, how many grams will you have in 80 years?
56. The half live of a radioactive material is 400 years. How long will it take 1200 grams to decay to 800 grams.
57. The half live of a radioactive material is 250 years. How long will it take 600 grams to decay to 100 grams

## Investments with compound interest.

$A = P\left(1 + \frac{r}{n}\right)^{nt}$  where  $P$  is the initial investment,  $A$  is the final accrued amount,  $r$  is the the annual interest rate ,  $n$  is the number of compounding periods a year and  $t$  is the number of years.

58. How much money must be invested invested for 10 years in a CD that pays 8% compounded quarterly to have \$1000 at the end of the 10 years?

59. What is the final accrued amount if \$ 12,400 is invested for 6 years in a CD that pays 4.5% compounded monthly?
60. How long will it take \$ 2,000 to grow to \$ 5,000 if it invested at 8% compounded semi annually?
61. How long will it take \$ 4,000 to grow to \$ 25,000 if it invested at 5% compounded quarterly?
62. How long will it take \$ 500 to grow to \$ 800 if it invested at 6% compounded monthly??
63. What return on your money is needed to have \$ 600 increase to \$ 1000 if the rate is compounded semi annually?