

1. Given the exponential decay function $g(t) = 40e^{-0.2t}$, evaluate $g(5)$, $g(-3)$, $g(0)$, and $g(.5)$ accurate to the third decimal place.

$$g(5) = 14.715, \quad g(-3) = 72.885, \quad g(0) = 40, \quad g(.5) = 40e^{(-.2 \times .5)} = 36.1935$$

2. Suppose that \$2,000 is deposited in a savings account with an annual interest rate of 11%. Calculate the amount of money in the account at the end of 5 years if the interest is compounded quarterly, compounded monthly and compounded continuously.

$$A = 2000\left(1 + \frac{11}{4}\right)^{(4 \times 5)} = \$3440.86 \text{ compounded quarterly,} \quad \text{compounded monthly } \$3457.83$$

$$A = 2000e^{(.11 \times 5)} = \$3466.51 \text{ compounded continuously:}$$

3. Suppose that a principal of \$3500 is deposited in a savings account whose annual rate of interest is 9%. Calculate the future value of this principal in 18 years if interest is compounded continuously.

$$A = 3500e^{(.09 \times 18)} = 17685.82 \quad A = \$17685.82$$

4. Evaluate; $5^{2e} = 6309.5$, $\left(\frac{1}{2}\right)^{-4} = 16$, $11e^{\sqrt{3}} = 62.175$

5. Find the domain of $f(x) = 2^x$, $g(x) = \left(\frac{1}{2}\right)^x$

$$(-\infty, \infty) \text{ for both functions.}$$

6. Find the range of $f(x) = 2^x$, $g(x) = \left(\frac{1}{2}\right)^x$

$$(0, \infty) \text{ for both functions.}$$

7. Find the y -intercept of $f(x) = 2^x$, $g(x) = \left(\frac{1}{2}\right)^x$

$$(0, 1) \text{ for both functions.}$$

8. Evaluate : $\frac{300}{1 + e^{-2}} = 264.239$, $50e^{-.0125 \times 2} = 48.76$ $50e^{-.0125 \times 2002} = 7(10^{-10})$

9. Certain population increases according to the model $P(t) = 250e^{0.47t}$. Use the model to determine the population when :

$$t = 10: 27,487, \quad t = 15: 288,215, \quad \text{and } t = 30: P(30) = 250e^{(.47 \times 30)} = 332,270,820$$

10. A particular radioactive substance has a half-life of 30 days. How much of an initial sample of 100 grams will remain after 10 days, 50 days, and 100 days?

10 days: $A = 100(2^{-\frac{10}{30}}) = 79.37 \text{ g}$,

50 days: $A = 31.498 \text{ g}$,

and 100 days: $A = 9.921 \text{ g}$

11. Assume the doubling time of the population of Monticello is 60 years. If the present population is 10000, what will be the population of Monticello in

a) 10 years $10000 \times 2^{\frac{10}{60}} = 11225$

b) 50 years $10000 \times 2^{\frac{50}{60}} = 17818$

c) 100 years $10000 \times 2^{\frac{100}{60}} = 31748$