

Applications of Exponential and Logarithmic Functions Video Lecture

Sections 12.3 and 12.7

Course Learning Objective:

- 1) Solve certain types of exponential and logarithmic equations.**
- 2) Demonstrate appropriate manipulation of exponential and logarithmic expressions.**
- 3) Model applications based on these equations and their graphs.**

Weekly Learning Objectives:

- 1) Solve exponential equations.**
- 2) Solve logarithmic equations.**
- 3) Solve problems that can be modeled by exponential and logarithmic equations including interest rate and population problems.**

Applications of Exponential and Logarithmic Functions

The population of Pakistan, in millions, is approximated by the function

$$f(x) = 126.4 (2)^{.04x}$$

where $x = 0$ corresponds to 1994.

a) What is the population of Pakistan in 1994?

b) What will the population be in 2019?

The formula $A = P \left(1 + \frac{r}{n}\right)^{nt}$ calculates the amount of money accrued if compounded n times per year.

$P =$ principal invested

$r =$ annual interest rate
(as a decimal)

$t =$ time (in years)

$n =$ # of compounding
periods per year

Find how long it takes \$600 to double if it is invested at 7% interest compounded monthly.

Find how long it takes a \$1500 investment to earn \$200 interest if it is invested at 10% compounded semiannually.

The formula $A = Pe^{rt}$ calculates the amount of money accrued if compounded continuously.

Determine the size of an account in which \$3500 earns 6% compounded continuously for 1 year.

Find the length of time for \$25,000 to triple when it is compounded at 6% annual interest, compounded continuously.

Suppose that a flu virus spreads according the following relationship:

$$y = y_0 e^{.0075t}$$

where y_0 represents the number of people affected at time 0, and y represents the number of people affected at any time t (t given in hours). If 20,000 people are affected now, in how many days will 45,000 people be affected?