# Algebra 2 8.1 Exploring Exponential Models Name:

Exponential Function

*growth* factor *decay* factor

Graph:

|  |  |
| --- | --- |
| *x* |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Compare the graphs of and on your calculator.

Ex: *The population of the U.S. in 1994 was about 260 million people with an average annual increase of about 0.7%.*

Find the growth factor for that year.

Suppose the rate of growth has continued to be 0.7%.

Write a function to model this population growth.

Use this model to predict the U.S. population in 2014.

Finding an Exponential Function

Ex: Write an exponential function for a graph that includes the points and .

Exponential Decay: (when )

Graph:

|  |  |
| --- | --- |
| *x* |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Compare the graphs of and on your calculator.

Without graphing, determine if the function is an exponential growth or an exponential decay.

Application: *Suppose you buy a used car for $11,800. The expected depreciation is 20% per year. Estimate the depreciated value of your car after 6 years.*

# Algebra 2 8.2 Properties of Exponential Functions

Graphing: (when ) label: exponent = 0 and =1

reflection over *x*-axis

asymptote:

**Translating:**

(right 3 and down 2)

**Example:**

**Example:**

Application: *Using the fact that Technetium-99 has a half-life of 6 hours, find the amount of Technetium-99 that remains from a 50 mg supply after 25 hours.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of hours | 0 | 6 | 12 | 18 | 24 | 30 |
| Number of 6 hour intervals | 0 | 1 | 2 | 3 | 4 | 5 |
| mg of Technetium-99 | 50 | 25 | 12.5 | 6.25 | 3.125 | 1.5625 |

*y* = amount of Technetium-99

*x* = number of hours

= number of half-life periods

How much Technetium-99 will remain after 15 hours?

Graph of estimate to 4 decimal places

Continuously Compounded Interest Formula

Example: *Suppose you invest $100 at an annual interest rate of 4.8% compounded continuously. How much will you have in the account after 3 years?*