7-6

The Natural Base, *e*

Lesson Objective:

Use the number *e* to write and graph exponential functions representing real-world situations.

Solve equations and problems involving *e* or natural logarithms.

Part 2

Jul 23-12:01 PM

The formula for continuously compounded interest is $A = Pe^{rt}$, where A is the total amount, P is the principal, r is the annual interest rate, and t is the time in years.

DO NOT CONFUSE THIS WITH THE FORMULA FROM EARLIER in the Lesson. You only use this formula when you read and/or see the words: **compounded continuously.**

Apr 22-6:36 AM

Sierra invests $1000 with an interest rate of 7.25% that is compounded continuously.

a) Write a model that represents the value of her investment over time in years.

b) How much money will she have in the bank after 15 years?

c) How long will it take Sierra to have $6500 in the bank?

Apr 22-1:44 PM

The amount of money in a bank account is modeled by the equation

$A = 300e^{.12t}$

Approximately how many years will it take for the amount to be $1100?

Apr 22-1:46 PM

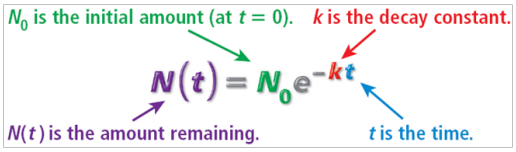
What is the total amount for an investment of $100 invested at 3.5% for 8 years and compounded continuously?

Apr 22-1:42 PM

What is the total amount for an investment of $320 invested at 0.5% for 5 years and compounded continuously?

Apr 22-1:43 PM

The *half-life* of a substance is the time it takes for half of the substance process of decay. Natural decay is modeled by the function below.



Apr 22-1:43 PM

Pluonium-239 (Pu-239) has a half-life of 24,110 years. How long does it take for a 1 g sample of Pu-239 to decay to 0.1 g?

Step 1 Find the decay constant for plutonium-239.

Step 2 Write the decay function and solve for *t*.

Apr 22-1:49 PM

Determine how long it will take for 650 mg of a sample of chromium-51 which has a half-life of about 28 days to decay to 200 mg.

Step 1 Find the decay constant for Chromium-51.

Step 2 Write the decay function and solve for *t*.

Apr 22-1:50 PM

The half-life of carbon-14 is 5730 years. What is the age of a fossil that only has 8% of its original carbon-14?

Apr 22-1:51 PM