D.5 - Notes Day 2 - Exponential/Log Applications and Models

The Number "e":

A naturally occurring constant, like *pi*. Its used as a base of many real-life problems involving certain growth and decay.

*Lets try it out in our calculators... *(e^x)-button usually*

e^1 → 2.7183

$5 \cdot e^3$ → 100.4277

$e^{(0.25 \cdot 12)}$ → 20.0855

Feb 15-9:21 AM

Continuous Interest Model:

Amount after t years

$A = Pe^{rt}$ ← time: in years

Principal: initial value/amount

Interest Rate: Annual (convert to decimal!)

Ex.1

Suppose you invest $1050 at an annual interest rate of 6.5% compounded continuously. How much will you have after 7 years?

$P = 1050$

$r = .065$

$t = 7$

$A = 1050 \cdot e^{(.065 \cdot 7)}$

$A = \$1654.98$

Feb 14-10:16 AM

Ex.2
Suppose you invest $800 at an annual interest rate of 4% compounded continuously. How much will you have after 15 years?

$P = 800$
$r = .04$
$t = 15$

$A = 800 \cdot e^{(.04 \cdot 15)}$

$A = \$1,457.70$

Ex.3
Suppose you invest $120,000 at an annual interest rate of 3.5% compounded continuously. How much will you have after 30 months?

$P = 120000$
$r = .035$
$t = 2.5$

$30 \div 12 = 2.5$ yrs.

$A = 120000 \cdot e^{(.035 \cdot 2.5)}$

$A = \$130,973.07$

Feb 14-11:30 AM

Ex. 4 Write an exponential model for this situation and solve.

Bobby has $9220.52 in his bank account after 6 years of his principal investment being compounded continuously at 3.5%. What was the value of his initial investment? *(Round your answer to the nearest cent.)*

$P = ?$
$r = .035$
$t = 6$
$A = 9220.52$

$\frac{9220.52}{e^{(.035 \cdot 6)}} = \frac{P \cdot e^{(.035 \cdot 6)}}{e^{(.035 \cdot 6)}}$

$\$7,474.01 = P$

May 13-8:38 AM