COLLEGE ALGEBRA

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GPS # 32 | 3.5 | EXPONENTIAL FUNCTIONS AND INVESTING II | Class Time: 11:30-12:45 Date: 3/13/08

Useful Guidelines:

* Future value of an investment with continuous Compounding:
  If P is the amount invested at an interest rate r per year, the future value S at the end of t years is $S = Pe^{rt}$, with continuous compounding.
* The interest earned on an investment is the future value minus the original investment.

Good work.

1. Suppose that P is invested in CD account in which interest r is compounded continuously at 6% per year. The amount A accumulated after t years is $A = Pe^{rt}$. Find A if \$4000 is invested for

a) 6 years

$P = \$4,000$
$r = 0.06$
$t = 6$ years
$S = Pe^{rt}$
$S = 4000e^{(0.06)(6)}$
$S = 4000e^{(.36)}$
$S = \$5,733.32$

b) 20 years

$P = \$4000$
$r = 0.06$
$t = 20$ years
$S = Pe^{rt}$
$S = 4000e^{(0.06)(20)}$
$S = 4000e^{(1.2)}$
$S = \$13,280.47$

2. a) What is the future value of \$2000 invested for 10 years at 9% compounded continuously?
   b) How much will be earned on this investment?

a) $P = 2000$
$r = 0.09$
$t = 10$ years
$S = Pe^{rt}$
$S = 2000e^{(0.09)(10)}$
$S = 2000e^{(0.90)}$
$S = \$4919.21$

b) $4919.21 - 2000.00$
$\$2919.21$

So neat!

4. Suppose that \$250,000 is invested at 8% interest.
a) Find the amount of money in the account after 8 years if the interest is compounded annually.
b) Find the amount of money in the account after 8 years if the interest is compounded continuously.

a) $S = P(1+r)^t$
$P = 250,000$
$r = 0.08$
$t = 8$ years
$S = P(1+r)^t$
$S = 250,000(1+0.08)^{(8)}$
$S = \$462,732.55$

b) $S = Pe^{rt}$
$P = 250,000$
$r = 0.08$
$t = 8$ years
$S = Pe^{rt}$
$S = 250,000e^{(0.08)(8)}$
$S = 250,000e^{(.64)}$
$S = \$474,120.22$