

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.

*no
no
Gund
n.b.*

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

$$S = Pe^{rt}$$

$$r = 0.06$$

$$A = Pe^{rt}$$

$$4000 e^{(0.06)(6)}$$

$$= 4000 e^{0.36}$$

$$= \$5,733.32$$

b) 20 years

$$4000 e^{(0.06)(20)}$$

$$= 4000 e^{1.2}$$

$$= \$13,280.47$$

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?

$$P = \$2000$$

$$t = 10 \text{ yrs}$$

$$r = 0.09$$

$$S = Pe^{rt}$$

$$2000 e^{(0.09)(10)}$$

$$2000 e^{0.9}$$

$$= 4919.21$$

b) $4919.21 - 2000$

$\$2919.21$

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.

b) $250,000 e^{(0.08)(8)}$

$$250,000 e^{0.64}$$

$$= \$474,120.22$$

$$S = P(1+r)^t \text{ compounded annually}$$
~~$$S = P(1 + \frac{r}{k})^{kt}$$~~

$$S = Pe^{rt} \text{ compounded continuously}$$

a) $250,000(1+0.08)^8$

$$= 250,000(1.08)^8$$

$$= \$462,732.55$$