

8.1 - 8.2 Part 2

Compound Interest Formula

$$A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$$

$A(t)$ = the amount of \$ after t years

P = the amount of \$ invested or borrowed

r = percent as a decimal

t = the number of years

n = the number of times interest is compounded per year

annually $\rightarrow n = 1$

Semiannually $\rightarrow n = 2$

quarterly $\rightarrow n = 4$

monthly $\rightarrow n = 12$

daily $\rightarrow n = 365$

Example 1 $P = 1000$ $r = 12\% = .12$

A sum of $\$1000$ is invested at an interest rate of 12% per year. Find the amounts in the account after 3 years if interest is compounded **annually**, **semiannually**, **quarterly**, and **monthly**.

$n=1$ $n=2$ $n=4$ $n=12$

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$n=1$$

$$A = 1000 \left(1 + \frac{.12}{1} \right)^{1 \cdot 3}$$

$$A \approx \$1404.93$$

$$n=4$$

$$A = 1000 \left(1 + \frac{.12}{4} \right)^{4 \cdot 3}$$

$$A \approx \$1425.76$$

$$n=2$$

$$A = 1000 \left(1 + \frac{.12}{2} \right)^{2 \cdot 3}$$

$$A \approx \$1418.52$$

$$n=12$$

$$A = 1000 \left(1 + \frac{.12}{12} \right)^{12 \cdot 3}$$

$$A \approx \$1430.77$$

Example 2

A sum of \$2250 is invested at an interest rate of 8.5% per year. Find the amounts in the account after 5 years if interest is compounded **semiannually**, **quarterly**, **monthly**, and **daily**.

semiannually

$$A = 2250 \left(1 + \frac{.085}{2}\right)^{2 \cdot 5}$$

$$A \approx \$3411.48$$

quarterly

$$A = 2250 \left(1 + \frac{.085}{4}\right)^{4 \cdot 5}$$

$$A \approx \$3426.29$$

monthly

$$A = 2250 \left(1 + \frac{.085}{12}\right)^{12 \cdot 5}$$

$$A \approx \$3436.43$$

daily

$$A = 2250 \left(1 + \frac{.085}{365}\right)^{365 \cdot 5}$$

$$A \approx \$3441.41$$