

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

Example 1 $A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$ $r = 0.12$

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**.

annually $n=1$	Semiannually $n=2$	quarterly $n=4$	monthly $n=12$
$(1000)\left(1 + \frac{0.12}{1}\right)^{1 \cdot 3}$	$1000\left(1 + \frac{0.12}{2}\right)^{2 \cdot 3}$	$1000\left(1 + \frac{0.12}{4}\right)^{4 \cdot 3}$	$1000\left(1 + \frac{0.12}{12}\right)^{12 \cdot 3}$
\$1404.93	\$1418.52	\$1425.76	\$1430.77

Example 2

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

$$r = 0.085$$

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 $n=2$	quarterly $n=4$	monthly $n=12$	daily $n=365$
$(2250) \left(1 + \frac{0.085}{2} \right)^{2 \cdot 5}$	$(2250) \left(1 + \frac{0.085}{4} \right)^{4 \cdot 5}$	$(2250) \left(1 + \frac{0.085}{12} \right)^{12 \cdot 5}$	$(2250) \left(1 + \frac{0.085}{365} \right)^{365 \cdot 5}$
\$3411.48	\$3426.29	\$3436.43	\$3441.41

Example 3

a) Find the final amount for an \$800 investment at 7% interest compounded quarterly for 10 years.

$$r = 0.07$$

$$(800) \left(1 + \frac{0.07}{4} \right)^{4 \cdot 10} = \$1601.28$$

b) Find the final amount for a \$3000 investment at 4.25% interest compounded daily for 2 years.

$$r = 0.0425$$

$$(3000) \left(1 + \frac{0.0425}{365} \right)^{365 \cdot 2} = \$3266.14$$