COMPOUND INTEREST Exponential growth functions are used in real-life situations involving *compound interest*. Compound interest is interest paid on the initial investment, called the *principal*, and on previously earned interest. Interest paid only on the principal is called *simple interest*.

KEY CONCEPT *For Your Notebook*

Compound Interest

Consider an initial principal P deposited in an account that pays interest at an annual rate r (expressed as a decimal), compounded n times per year. The amount A in the account after t years is given by this equation:

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

EXAMPLE 5 Find the balance in an account

FINANCE You deposit $4000 in an account that pays 2.92% annual interest. Find the balance after 1 year if the interest is compounded with the given frequency.

a. Quarterly

b. Daily

Solution

a. With interest compounded quarterly, the balance after 1 year is:

$A = P\left(1 + \frac{r}{n}\right)^{nt}$ — Write compound interest formula.

$= 4000\left(1 + \frac{0.0292}{4}\right)^{4 \cdot 1}$ — $P = 4000$, $r = 0.0292$, $n = 4$, $t = 1$

$= 4000(1.0073)^4$ — Simplify.

≈ 4118.09 — Use a calculator.

▶ The balance at the end of 1 year is $4118.09.

b. With interest compounded daily, the balance after 1 year is:

$A = P\left(1 + \frac{r}{n}\right)^{nt}$ — Write compound interest formula.

$= 4000\left(1 + \frac{0.0292}{365}\right)^{365 \cdot 1}$ — $P = 4000$, $r = 0.0292$, $n = 365$, $t = 1$

$= 4000(1.00008)^{365}$ — Simplify.

≈ 4118.52 — Use a calculator.

▶ The balance at the end of 1 year is $4118.52.

GUIDED PRACTICE for Example 5

6. FINANCE You deposit $2000 in an account that pays 4% annual interest. Find the balance after 3 years if the interest is compounded daily.