Extending Concepts

Savings Goals **In Exercises 21 and 22, use the information below.**

For an increasing annuity, the monthly deposit M that you must make for n months, at an annual percentage rate of r (in decimal form), to achieve a balance of A is

$$M = \frac{A\left(\frac{r}{12}\right)}{\left(1 + \frac{r}{12}\right)^n - 1}.$$

21. You start saving for retirement at age 25. You want to have \$1 million when you retire in 42 years. You invest in a savings plan that earns 6%, compounded monthly.

a. How much should you deposit each month?

b. Suppose you wait until you are 30 to start saving. How much more do you have to deposit each month compared to the amount in part (a)?

22. You want to have \$20,000 to help pay for your child's college education in 18 years. You invest in a savings plan that earns 4.8%, compounded monthly.

a. How much should you deposit each month?

b. Suppose you want to have the money in 10 years. How much more do you have to deposit each month compared to the amount in part (a)?

Annual Percentage Yield **In Exercises 23–26, use the information below.**

The *annual percentage yield* (APY) is the rate at which an investment increases each year. The formula for the APY of an investment with an annual percentage rate of r that is compounded n times a year is

$$\text{APY} = \left(1 + \frac{r}{n}\right)^n - 1.$$

23. Find the APY for an investment that earns 6% for each compounding period.

a. Daily **b.** Monthly **c.** Quarterly

d. Semiannually **e.** Annually

24. Find the APY for an investment that earns 7% for each compounding period.

a. Daily **b.** Monthly **c.** Quarterly

d. Semiannually **e.** Annually

25. For what compounding period is the APY the same as the APR? Explain your reasoning.

26. Which of the following earns more interest annually?

a. An investment with an APY of 6%

b. An investment with an APR of 5.9%, compounded monthly