

The formula for the future value of an annuity is:

$$FV = \text{pymt} \cdot \frac{\left(1 + \frac{r}{n}\right)^{nt} - 1}{\left(\frac{r}{n}\right)}$$

pymt = payment

r = rate

n = # of compoundings per year

t = # of years.

ex: George deposits \$100 out of each of his biweekly paychecks into an annuity earning interest of 6%. He is 25 years old and his annuity comes to term when he's 65.

a) Find the FV

$$\text{pymt} = 100$$

$$r = .06$$

$$n = 26$$

$$t = 40$$

b) What is George's total contribution?

$$100 \cdot 26 \cdot 40 = \$104,000$$

c) What is the total interest?

$$\begin{array}{r} 433,018.71 \\ - 104,000 \\ \hline \$ 329,018.71 \end{array}$$

$$FV = 100 \cdot \frac{\left(1 + \frac{.06}{26}\right)^{(26 \cdot 40)} - 1}{\left(\frac{.06}{26}\right)}$$

$$\begin{array}{l} 100 \left( \left(1 + \frac{.06}{26}\right)^{(26 \cdot 40)} - 1 \right) / \left(\frac{.06}{26}\right) \\ \text{enter} \\ = \$ 433,018.71 \end{array}$$

10. Dick Eckel recently set up a TDA to save for his retirement. He arranged to have \$110 taken out of each of his biweekly checks; it will earn  $9\frac{7}{8}\%$  interest. He just had his twenty-ninth birthday, and his ordinary annuity comes to term when he is sixty-five. Find the following.

- a. the future value of the account
- b. Dick's total contribution to the account
- c. the total interest

11. Sam Whitney recently set up a TDA to save for his retirement. He arranged to have \$290 taken out of each of his monthly checks; it will earn 11% interest. He just had his forty-fifth birthday, and his ordinary annuity comes to term when he is sixty-five. Find the following.

- a. the future value of the account
- b. Sam's total contribution to the account
- c. the total interest

12. Art Dull recently set up a TDA to save for his retirement. He arranged to have \$50 taken out of each of his biweekly checks; it will earn  $9\frac{1}{8}\%$  interest. He just had his thirtieth birthday, and his ordinary annuity comes to term when he is sixty-five. Find the following.

- a. the future value of the account
- b. Art's total contribution to the account
- c. the total interest

16. the annuity in Exercise 6
17. the annuity in Exercise 9
18. the annuity in Exercise 10

*In Exercises 19–24, find the monthly payment that will yield the given future value.*

19. \$100,000 at  $9\frac{1}{4}\%$  interest for 30 years; ordinary annuity
20. \$45,000 at  $8\frac{7}{8}\%$  interest for 20 years; ordinary annuity
21. \$250,000 at  $10\frac{1}{2}\%$  interest for 40 years; ordinary annuity
22. \$183,000 at  $8\frac{1}{4}\%$  interest for 25 years; ordinary annuity
23. \$250,000 at  $10\frac{1}{2}\%$  interest for 40 years; annuity due
24. \$183,000 at  $8\frac{1}{4}\%$  interest for 25 years; annuity due