

## Investments Involving Regular Payments

For an investment that involves a series of equal deposits or payments made at regular intervals, the future value is the sum of all the regular payments plus the accumulated interest. If the regular payments have the same frequency as the compounding interest, then the future value can be calculated as follows:

$$FV = \frac{Rn}{r} \left[ \left( 1 + \frac{r}{n} \right)^{nt} - 1 \right]$$

FV = future value

R = regular payment amount

n = number of compounding periods per year

r = interest rate per year

t = time in years

### Example 1: Determining the Future Value of an Investment Involving Regular Deposits

Darva is saving for a trip to Australia in 5 years. She deposits \$500 into her savings account at the end of each 6-month period. The account earns 3.8%, compounded semi-annually.

- How much money will be in the account at the end of 5 years?
- How much of this money will be earned interest?

**Solution:**

### Example 2: Comparing a Regular Payment Investment with a Single Payment Investment

Adam made a \$200 payment at the end of each year into an investment that earned 5%, compounded annually. Blake made a single investment at 5%, compounded annually. At the end of the 5 years, their future values were equal.

- a. What was their future value?
- b. What principal amount did Blake invest 5 years ago?
- c. Who earned more interest?

**Solution:**

### Example 3: Determining the Regular Payment Amount of an Investment

Celia wants to have \$300 000 in 20 years so that she can retire. She has found a trust account that earns a fixed rate of 10.8%, compounded monthly.

- a. What regular payments must Celia make at the end of each month to meet her goal?
- b. How much interest will she earn over the 20 years?

**Solution:**