Chapter 21: Saving Models

For All Practical Purposes

Mathematical Literacy in Today's World, 9th ed.

Section 21.1 Arithmetic Growth and Simple Interest

James Baglama
Department of Mathematics
University of Rhode Island

Arithmetic Growth and Simple Interest

Principal – The initial balance of the savings account.

Interest – Money earned on a savings account or a loan.

Example: The amount of interest on 10% of the principal of $1000 is

$$10\% \times \$1000 = 0.10 \times \$1000 = \$100$$

Simple Interest

- The method of paying interest only on the initial balance in an account, not on any accrued interest.

Example: The following shows the simple interest of a savings account with a principal of $1000 and a 10% interest rate:

- End of first year, you receive $100 interest.
- The account total at the start of the second year is $1100.
- End of second year, you receive again only $100, which is the interest from the original balance of $1000.
- Account total at the beginning of the third year is $1200.
- At the end of each year you receive just $100 in interest.

2

Arithmetic Growth and Simple Interest

Bonds

- An obligation to repay a specified amount of money at the end of a fixed term, with simple interest usually paid annually.
- Interest Rate Formula: $I = Prt$
- The total amount accumulated:

$$A = P(1 + rt) = P + Prt = P + I$$

Example: Say you deposited $10,000. What would be the total amount accumulated in 10 years at 4.0% simple interest?

Answer:

P = \$10,000, r = 4.0% = 0.04, and t = 10 yrs.

Interest, $I = Prt$ = (10,000)(0.04)(10) = \$4000

Total $A = P(1 + rt)$ = 10,000(1 + (0.04)(10))
= 10,000(1.40) = \$14,000

Interest Rate Formula –

$$I = Prt$$

Where:

I = Simple interest earned
P = Principal amount
r = Annual rate of interest
t = Time in years

Total Amount Accumulated

$$A = P(1 + rt)$$

Arithmetic Growth – (linear growth) $A = P(1 + rt)$

3

Arithmetic Growth

Simple interest: Interest is paid per year on the original balance only, no matter how much interest has accumulated.

Example: $1000 is deposited at simple interest of 10%. What will the total principal be after

a) 1 year
b) 2 years
c) 3 years
d) 20 years
e) n years

Solution: a) End of 1st year: $1000+0.10($1000)
=$1000+$100
=$1100

b) End of 2nd year: $1000+2($100)=$1200

c) End of 3rd year: $1000+3($100)=$1300

d) End of 20 years: $1000+20($100)=$3000

e) End of n years: $1000+n($100)

Old Exam Question

If you deposit $2000 at 7% simple interest, what is the balance after 2 years?

A) $2280.00

B) $2289.80

C) $2295.05

D) $2300.52

$$\$2000 + 2 \times (\$2000 \times 0.07) = \$2280.00$$