

# Chapter 3

## Interest and Equivalence

### 3-1

Solve for the unknown value. Be sure to show your work.

$$P = 1,000 \quad i = 12\% \quad n = 5 \quad F = ?$$

### 3-2

If you had \$1,000 now and invested it at 6%, how much would it be worth 12 years from now?

### 3-3

Mr. Beach deposited \$200,000 in the National Bank. If the bank pays 8% interest, how much will he have in the account at the end of 10 years?

### 3-4

If you can make 6% interest on your money, how much is \$1,000 paid to you 12 years in the future worth to you now?

### 3-5

Downtown is experiencing an explosive population growth of 18% per year. At the end of 2002 the population was 16,000. If the growth rate continues unabated, at the end of how many years will the population have passed 75,000?

### 3-6

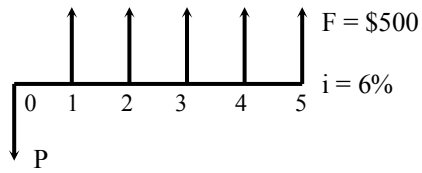
If the interest rate is 6% compounded quarterly, how long (number of quarters) does it take to earn \$100 interest on an initial deposit of \$300?

### 3-7

A man decides to put \$100 per month into an account paying 12% compounded monthly. Without using formulas or factors (that is, use only basic concepts) determine how much (to the penny) will be in the account immediately after the fourth deposit.

**3-8**

Write the functional notation of the future \$500 to determine P, and evaluate.

**3-9**

Draw a diagram that represents  $(P/F, i\%, 3)$ .

**3-10**

On July 1 and September 1, Abby placed \$2,000 into an account paying 3% compounded monthly. How much was in the account on October 1?

**3-1 Solution**

$$F = 1,000(F/P, 12\%, 5) = \$1,762.00$$

**3-2 Solution**

$$F = 1,000(F/P, 6\%, 12) = \$2,012.00$$

**3-3 Solution**

$$F = 200,000(F/P, 8\%, 10) = \$413,800$$

**3-4 Solution**

$$P = 1,000(P/F, 6\%, 12) = \$497.00$$

**3-5 Solution**

Use  $i = 18\%$  to represent the growth rate.

$$\begin{aligned} 75,000 &= 16,000(F/P, 18\%, n) \\ (F/P, 18\%, n) &= 75,000/16,000 \\ &= 4.6875 \end{aligned}$$

From tables  $n$  is 10

Note that population would not have passed 75,000 after 9 years.

**3-6 Solution**

$$i = 6\%/4 = 1\frac{1}{2}\%$$

$$\begin{aligned} 400 &= 300(F/P, 1\frac{1}{2}\%, n) \\ (F/P, 1\frac{1}{2}\%, n) &= 400/300 \\ &= 1.333 \end{aligned}$$

From tables  $n = 20$  quarters

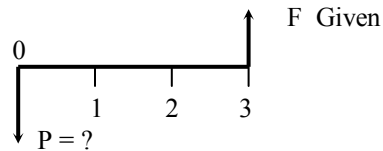
**3-7 Solution**

Month	Beginning Balance	Interest @ 1%	Deposit	Ending Balance
1	\$ 0.00	0.00	\$100	\$100.00
2	100.00	1.00	100	201.00
3	201.00	2.01	100	303.01
4	303.01	3.03	100	Ans→ 406.04

**3-8 Solution**

$$P = F(P/F, 6\%, 5) = \$500(0.7473) = \$373.65$$

**3-9 Solution**



**3-10 Solution**

$$F = 2,000(1 + 0.0025)^3 + 2,000(1 + 0.0025)^1 = \$4,020.04$$

OR

Month	Beginning Balance	Interest @ ½%	Ending Balance	Deposit
July	\$2,000.00	\$10.00	\$2,010.00	0
August	2,010.00	10.05	2,020.05	\$2,000.00
September	4,020.05	20.10	4,040.15	0
October	Answer→ 4,040.15			