

# Learning Plan 8

## Chapter 9

### Questions 1 & 2

(page 330 in the textbook)

Find the maturity value of the loan.

Principal	Rate	Time
\$4500	10%	18 <i>months</i>

### Solution

The time must be converted into years.

$$18 \text{ months} = 1.5 \text{ years}$$

Convert 10% to a decimal.

$$10\% = 0.1$$

Find interest first.

$$\begin{aligned} \text{Interest} &= 4500 \cdot 0.1 \cdot 1.5 \\ &= 675 \end{aligned}$$

Find the maturity value.

$$4500 + 675 = 5175$$

### Question 4

(pages 332-333)

Find both the exact and ordinary interest on \$39,100 at  $5\frac{1}{4}\%$  for 166 days. Then find the amount by which the ordinary interest is larger.

### Solution

$$5\frac{1}{4}\% = 5.25\% = 0.0525$$

The exact interest:

$$\$39,100 \cdot 0.0525 \cdot \frac{166}{365} \approx 933.58$$

The ordinary interest:

$$\$39,100 \cdot 0.0525 \cdot \frac{166}{360} \approx 946.55$$

The amount by which the ordinary interest is larger:

$$946.55 - 933.58 = 12.97$$

### Question 5, 6, 7

Page 333 in the textbook

### Question 8

Find the due date and the maturity value. Assume that a year has 360 days for all calculations.

Date Made	Face Value	Term of Loan	Rate
<i>May 30</i>	\$6000	180 <i>days</i>	9%

#### Solution

*May 30* from table corresponds to 150.

$$150 + 180 = 330$$

330 from table corresponds to *Nov 26*.

$$\text{Interest} = 6000 \cdot 0.09 \cdot \frac{180}{360} = 270$$

$$\text{Maturity Value} = 6000 + 270 = 6270$$

### Question 9

Find the due date and the maturity value.

Date Made	Face Value	Term of Loan	Rate
<i>August 17</i>	\$5000	300 <i>days</i>	$8\frac{1}{2}\%$

#### Solution

*August 17* from table corresponds to 229.

$$229 + 300 = 529$$

$$529 - 365 = 164$$

164 from table corresponds to *June 13*.

$$\text{Interest} = 5000 \cdot 0.085 \cdot \frac{300}{360} = 354.17$$

$$\text{Maturity Value} = 5000 + 354.17 = 5354.17$$

### Questions 10-11

(page 339)

Find the principal.

Rate	Time (in days)	Interest
$9\frac{1}{2}\%$	150	\$475

Solution

$$P = \frac{I}{RT} = \frac{475}{0.095 \cdot \frac{150}{360}} = 12,000$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$475 \div 0.095 \cdot 360 \div 150 = 12,000$$

### Questions 12-13

(pages 340-341)

Find the rate.

Principal	Time (in days)	Interest
3420	205	95

Solution

$$R = \frac{I}{PT} = \frac{95}{3420 \cdot \frac{205}{360}} \approx 0.04878 \dots \approx 4.9\%$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$95 \div 3420 \cdot 360 \div 205 \approx 0.04878 \approx 4.9\%$$

### Questions 14-15

(page 339)

Find the time.

Principal	Rate	Interest
\$37,200.00	5.5%	\$930

#### Solution

$$T = \frac{I}{PR} \cdot 360 = \frac{930}{37,200 \cdot 0.055} \cdot 360 \approx 163.6363 \dots \approx 164$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$930 \div 37,200 \div 0.055 \cdot 360 \approx 164$$

### Question 16

Melissa notes that her savings account earned \$54.39 in nine months. If the interest for her account is 6.5%, what was her principal?

#### Solution

$$P = \frac{I}{RT} = \frac{54.39}{0.065 \cdot \frac{9}{12}} \approx 1115.69$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$54.39 \div 0.065 \cdot 12 \div 9 \approx 1115.69$$

### Question 17

A person invested \$3878. Find the rate given that he earned \$237.80 in 250 days. Use the banker's interest with 360 days.

#### Solution

$$R = \frac{I}{PT} = \frac{237.80}{3878 \cdot \frac{250}{360}} \approx 0.088301 \dots \approx 8.8\%$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$237.80 \div 3878 \cdot 360 \div 250 \approx 0.088301 \dots \approx 8.8\%$$

### Question 18

Over a period of 240 days, Shawna earned \$350 interest in a retirement account paying interest at a rate of 10%. Find (a) the principal at the beginning of the 240 days and (b) the amount in the account at the end of 240 days.

#### Solution

a)

$$P = \frac{I}{RT} = \frac{350}{0.1 \cdot \frac{240}{360}} = 5250$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$350 \div 0.1 \cdot 360 \div 240 = 5250$$

b)

$$5250 + 350 = 5600$$

### Question 19

Maria deposited an inheritance of \$12,900.00 in a bank and earned \$430.00 in simple banker's interest at a rate of 8.5%. Find the length of time the money was on deposit.

#### Solution

$$T = \frac{I}{PR} \cdot 360 = \frac{430}{12,900 \cdot 0.085} \cdot 360 = 141$$

If you are just using a basic calculator, this is how you can put these numbers into your calculator:

$$430 \div 12,900 \div 0.085 \cdot 360 = 141$$

### Question 20

A bank borrowed \$80,000,000 at 5% interest for 180 days from an investment house. At the same time, the bank made the following three loans, each for the exact same 180-day period.

1. A 6% simple interest note for \$42,000,000 to a firm that extracts oil from tar sands;
2. An 8.2% simple discount note for \$27,500,000 to a contractor building a highway;
3. An 8% simple discount note for \$10,500,000 to a company building minesweepers for the government. Use this information to answer parts (a) through (c).

#### Solution

a)

Find the difference between interest received and interest paid by the bank on these funds.

$$I = 80,000,000 \cdot 0.05 \cdot \frac{180}{360} = 2,000,000$$

$$I = 42,000,000 \cdot 0.06 \cdot \frac{180}{360} = 1,260,000$$

$$B = 27,500,000 \cdot 0.082 \cdot \frac{180}{360} = 1,127,500$$

$$B = 10,500,000 \cdot 0.08 \cdot \frac{180}{360} = 420,000$$

$$1,260,000 + 1,127,500 + 420,000 = 2,807,500$$

$$2,807,500 - 2,000,000 = 807,500$$

b)

$$27,500,000 - 1,127,500 = 26,372,500$$

$$10,500,000 - 420,000 = 10,080,000$$

$$42,000,000 + 26,372,500 + 10,080,000 = 78,452,500$$

c)

$$R = \frac{I}{PT} = \frac{807,500}{78,452,500 \cdot \frac{180}{360}} = 0.020585705 \dots = 2.06\%$$