

Lesson Worksheet 7.3A(II)

Objective: To understand the concept of compound interest and to solve problems involving compound interest.

If the amount got in each period is used as the principal for calculating the interest in the next period, the method of calculating interest used is called compound interest.

若每期所得的本利和會作為下一期用作計算利息的本金，這種計算利息的方法稱為複利息。

In general, if we deposit \$ P at an interest rate of $r\%$ per period and the interest is compounded at the end of each period, then the amount \$ A after n periods is given by:

一般而言，若我們把本金 \$ P 以每期利率 $r\%$ 存入銀行，每期期末計算複利息一次，則 n 期後的本利和 \$ A 可表示成：

future now

$$A = P(1 + r\%)^n$$

➤ The compound interest \$ I earned is given by 所得的複利息 \$ I 可表示成:

$$I = A - P$$

1. Terry deposits a sum of money in a bank at an interest rate of 3.6% p.a., compounded monthly. After one year, he will receive an amount of \$20 732. Find the amount deposited by Terry.
(Give the answer correct to the nearest thousand dollars.)

Let \$ P be the sum of money deposited.

$$P \left(1 + \frac{3.6\%}{12} \right)^{12} = \underline{20\,732}$$

$$P = \frac{20\,732}{1.003^{12}}$$

$$P = \underline{20\,000}, \text{ corr. the nearest thousand}$$

∴ Terry deposits \$ 20 000.

Demonstration

Joey deposits a sum of money in a bank at an interest rate of 4% p.a., compounded half-yearly. After two years, she will receive an amount of \$14 070. Find the amount deposited by Joey.

(Give the answer correct to the nearest thousand dollars.)

Solution

Let \$ P be the sum of money deposited.

$$\text{Amount} = \$P \left(1 + \frac{4\%}{2} \right)^4$$

$$= \$P(1.02)^4$$

$$P(1.02)^4 = 14\,070$$

$$P = \frac{14\,070}{1.02^4}$$

$$= 13\,000, \text{ cor. to the nearest}$$

thousand

∴ Joey deposits \$13 000.

2. Ben deposits a sum of money in a bank at an interest rate of 5.1% p.a., compounded quarterly. After two years, he will receive an amount of \$44 270. Find the amount deposited by Ben.

(Give the answer correct to the nearest thousand dollars.)

Let \$ P be the sum of money deposited.

Set up an equation using the amount deposited as the unknown and solve it.

$$P \left(1 + \frac{5.1\%}{4} \right)^{(8)} = \underline{44\,270}$$

$$P = \frac{44270}{1.01275^8}$$

$$P = \underline{40\,000}, \text{ corr. to the nearest thousand}$$

∴ Ben deposits \$ 40 000.

- *3. Mr Lee deposits a sum of money in a bank at an interest rate of 6% p.a., compounded monthly. After 1.5 years, he will receive interest of \$1616. Find the amount deposited by Mr Lee.

(Give the answer correct to the nearest hundred dollars.)

Let \$ P be the sum of money deposited.

$$P \left(1 + \frac{6\%}{12} \right)^{(18)} - P = \underline{1616}$$

$$P = \frac{1616}{1.005^{18} - 1}$$

$$P = \underline{17\,200}, \text{ corr. the nearest hundred}$$

∴ Mr Lee deposits \$ 17 200.

- *4. Alice deposits a sum of money in a bank at an interest rate of 7% p.a., compounded quarterly. After three years, she will receive interest of \$3610. Find the amount deposited by Alice.

(Give the answer correct to the nearest hundred dollars.)

Let \$ P be the sum of money deposited.

$$P \left(1 + \frac{7\%}{4} \right)^{(12)} - P = \underline{3610}$$

$$P(1.0175^{12} - 1) = 3610$$

$$P = \frac{3610}{1.0175^{12} - 1}$$

$$P = \underline{15\,600}, \text{ corr. the nearest hundred}$$

∴ Alice deposits \$ 15 600.