FIN 316

WORKBOOK

Financial Mathematics (2)

Secondary Level

البحرين
BAHRAIN

Financial Mathematics (2)

WORKBOOK

مال 316

For Secondary Education

First Edition

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THE KING OF THE KINGDOM OF BAHRAIN

Content

Introduction

We are delighted to present to you this workbook, that will provide various ideas that shall cover all the topics in the textbook.

The workbook will contribute to enhance the students comprehension of the subject as it has includes diverse activities and exercises that shall support and prepare the students for exams, the university and with their future job.

Those activities and exercises are in line with modern teaching and learning strategies that take into account individual differences and excellence among students.

This workbook can be used as a self-study resource, which encourages students to learn more by themselves.

General Objective

At this course, our students will learn:

1. calculate compound interest.
2. computing amount of annuities and loans amortization.
3. evaluating the project and capital budgeting decision model.
4. knowing and calculate breakeven point.
5. calculating ratio analysis.

The content of this book divided into five units address as follow:

Unit One   :   Compound Interest

Unit Two   :   Annuities and Loans Amortization

Unit Three   :   Capital Budgeting Decision Model

Unit Four   :   Breakeven Analysis

Unit Five   :   Ratio Analysis

Unit 1

Compound Interest

Text book Exercises

Activity 1-2-1:

1- Find the value of the following (by using the interest table) :

a - $(1.06)^{12}$ b- $(1.0525)^{60}$ c - $(1.005)^{125}$

Answer:

a - ....

b- ....

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c - ....

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2- Bader deposited BD4,200 for 14 years at 5.6% annually. Find the future value at the end of the period.

Answer:

$$FV = PV \times (1+i)^n$$

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3- A trader wants to borrow BD20,000 and pays it after 3 years, he has two choices:

- Borrowing on a simple interest at 5¾% annually
- Borrowing on a compound interest at 4% annually

Which choice should he choose? Why?

Answer:

$$SI = PV \times I \times T$$

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$$FV = PV \times (1+i)^n$$

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$$CI = FV - PV$$

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We choose compound interest because its lower than simple interest. But the comparing is not true for difference rate and periods.

4- Find the future value of BD1,500 at 9.4% annually for 8 years using a calculator.

Answer:

$$FV = PV \times (1+i)^n$$

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5- Find the future value and compound interest for BD2,400 at 4.5% annually for 74 years by using interest tables.

Answer:

$$FV = PV \times (1+i)^n$$

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$$CI = FV - PV$$

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6- A person deposited $6000 for 4 years at 5.5% annually. Find the future value and the compound interest at the end of the period.

Answer:

$$FV = PV \times (1+i)^n$$

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$$CI = FV - PV$$

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<u>Activity 1-3-1:</u>

1- Mariam deposited BD2550 in a bank at an effective rate of 6% annually. If the interest is compounded semi-annually. Calculate her fund at the end of 8 years, and then find the compound interest.

<u>Answer:</u>

n = ………………………………………………………………………….

i = …………………………………………………………………….……..

$$FV = PV \times (1+i)^n$$

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$$CI = FV - PV$$

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2- Faisal wants to borrow KD7200 from a bank to buy a new car if you know the interest rate is 6% annually compounded monthly. Find how much he will pay to the bank at the end of 10 years.

<u>Answer:</u>

n = …………………………………………………………………………

i = …………………………………………………………………………

$$FV = PV \times (1+i)^n$$

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3- Sakeena Ahmed deposited BD2600 in a bank at 12% annually compounded quarterly. Find her fund at the end of 5 years and 9 months and find the compound interest.

Answer:

n = ………………………………………………………………………………

i = ………………………………………………………………………………..

$FV \;=\; PV \times (1+i)^{n}$

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$CI = FV - PV$

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4- A person deposited BD8750 at 3% each quarter – find the future value and the interest at the end of 6 years.

Answer:

n = …………………………………………………………………………………

i = …………………………………………………………………………………

$FV \;=\; PV \times (1+i)^{n}$

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$CI = FV - PV$

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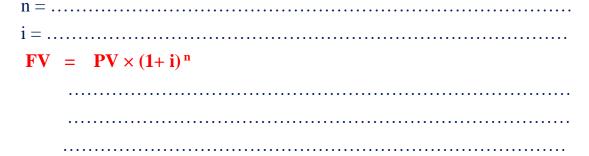
5- A person deposited BD3500 at 4% every 6 months. Find the future value at the end of 8 years and 6 months.

Answer:

n = …………………………………………………………………………………

i = …………………………………………………………………………………

$FV \;=\; PV \times (1+i)^{n}$

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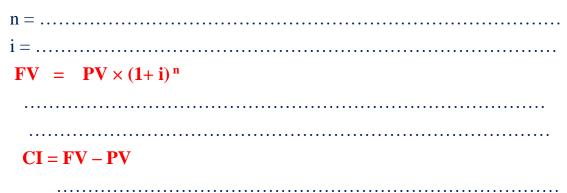…………………………………………………………………………………

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6- Laila borrowed \$6400 from a bank at 5% every 4 months. Find the amount she will pay at the end of three years and 8 months. In addition, calculate the interest.

Answer:

n = ……………………………………………………………………………

i = ……………………………………………………………………………

$$FV \;=\; PV \times (1+i)^{n}$$

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$$CI = FV - PV$$

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Activity 1-4-1:

1- Find the future value and compound interest for BD10,000 invested for 4 years, if you know that the rate is changing as follows : 3% annually for the first year, 2.5% annually for the second year, 2% annually for the third year and 1% annually for the fourth year.

Answer:

$$FV = PV \times (1+i)^{n}$$

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$$CI = FV - PV$$

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2- What is the future value for BD2,000 invested at 6% annually for 3 years and 4.8% annually for 5 more years?

Answer:

$$FV \;=\; PV \times (1+i)^{n}$$

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3- Find the future value that Saad will get if he saves BD2,000 in a bank for 10 years at changing rate, as following: at 5% annually for the first 5 years, 4.6% annually for the sixth year and 6% annually compounded semi-annually for the rest years.

Answer:

$$FV = PV \times (1+i)^n$$

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4- Find the future value for BD2,000 invested for 7 years at 4.5% annually for the first 3 years and 5¾% annually for the rest years.

Answer:

$$FV = PV \times (1+i)^n$$

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Activity 1-4-2:

1- Noora invested BD4000 at Al- Ahli bank at an interest rate of 9% annually and after 3 years she deposited BD3000 to her account at 4% every 4 months. Find the future value and the compound interest at the end of 8 years from the first deposit.

CA for the first …… years

$$FV1 = PV1 \times (1+i)^n$$

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CI1 = ……………………………………

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The balance after deposit

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CA for the rest …… years

$$FV2 = PV2 \times (1+i)^n$$

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CI2 = ……………………………………

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CI = ………………………………………………………………………………

Or   CI = ………………………………………………………………………………

2- A person deposited BD7,000 at 6% annually, after two years he withdrew BD2,618 from his account and invested the rest at 7.5% annually, Find:

a- His fund after withdrawal

b- The future value for the remaining sum at the end of four years.

CA for the first … years

$FV1 = PV1 \times (1+i)^n$

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The balance after withdrawal

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CA for the rest …. years

$FV2 = PV2 \times (1+i)^n$

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3- Dawood deposited BD3,000 at a compound interest of 8% annually, after 3 years he added BD1220.864 to his account and the rate of interest increased to 10% annually. Find the future value at the end of 8 years from the first deposit.

CA for the first …. years

$FV1 = PV1 \times (1+i)^n$

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The balance after deposit

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CA for the rest ….. years

$FV2 = PV2 \times (1+i)^n$

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4- A trader borrowed BD20,000 on January 1st, 2000 from BBK and BD15,000 on January 1st,2001 and finally BD30,000 on January 2002. He promised to pay the debt on 31/12/ 2008. If the bank gives compound interest rate of 12% annually, find the amount that should be paid on 31/12/2008.

Answer:

$$FV = PV \times (1+i)^n$$

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Activity 1-5-1:

1- Find the present value (principal), if the amount after 5 years is BD1469.330 and the compound interest rate is 8% annually, then find the interest.

Answer:

$$PV = FV \div (1+i)^n$$

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$$CI = FV - PV$$

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2- Find the present value (principal), if the amount at the end of 7 years is BD6,450 and the compound interest rate is 4.5% annually for the first three years and 5% annually for the rest years.

Answer:

$$PV = FV \div (1+i)^n$$

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3- How much was deposited for an investment of 8% annually compounded quarterly to have an amount of BD2, 228.850 in 5 years?

Answer:

$n =$ …………………………………………………………………

$i =$ …………………………………………………………………

$$PV = FV \div (1+i)^n$$

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4- A man deposited money in NBB at 3% annually, after 5 years he withdrew BD2796.500 from his account and invested the rest for 5 years at 2% every 6 months – if the amount at the end of the period is BD3657. Find the present value.

Answer:

$n =$ …………………………………………………………………

$i =$ …………………………………………………………………

1- $$PV2 = FV2 \div (1+i)^n$$

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$FV1 = 3000 + 2796.500 = BD5796.500$

2- $$PV1 = FV1 \div (1+i)^n$$

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5- Find the present value (principal) that generates an interest of BD700 at 2% annually for 5 years.

Answer:

$$PV = CI \div [(1+i)^n - 1]$$

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6- Taha calculated the compound interest he will get it if he deposits his money in a bank at 3% annually for 20 years and it was BD 4836.667, find the present value.

Answer:

$$PV = CI \div [(1+i)^n - 1]$$

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Activity 1-5-2:

1- A loan of BD2,000 amounted to BD3591.713. Find the borrowing. period if the interest rate was 5% annually.

Answer:

$(1+i)^n$ = FV ÷ PV

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2- Nawal borrowed BD5,000 from a bank at 6% annually. Find the borrowing period if the compound interest was BD 8563.575.

Answer:

FV = CI + PV = ……………………………………………………….
$(1+i)^n$ = FV ÷ PV

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3- How long will it take BD2,000 at 2.5% compounded every semi-annually to give an interest of BD 560.169 ?

Answer:

FV = CI + PV

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$(1+i)^n$ = FV ÷ PV

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4- How long will it take an investment of BD4,000 to amount of BD5,610.400 at 7% annually?

Answer:

$(1+i)^n = FV \div PV$

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5- How long will it take the money to double itself at 4% annually?

Answer:

$(1+i)^n = FV \div PV$

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Activity 1-5-3:

1- Saad deposited BD1,400 in a bank that gives compound interest of BD 481.460 at the end of 10 years – Find the interest rate.

Answer:

$FV = CI + PV$

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$(1+i)^n = FV \div PV$

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2- Tahera borrowed €4,500 from a bank that gives compound interest of €1,916 at the end of 3 years. Find the quarterly interest rate and the annual rate of interest.

Answer:

$FV = CI + PV$

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$(1+i)^n = FV \div PV$

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3- If BD 6,600 amounts to BD10,750.740 in 10 years. Find the interest rate.

Answer:

$(1+i)^n = FV \div PV$

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4- Jawad borrowed BD8,000 for 4 years. If the compound interest was BD 2,948.800 find the semi-annually interest rate, and the annually interest rate.

Answer:

$FV = CI + PV$

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$(1+i)^n = FV \div PV$

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5- Find the interest rate for ¥7,730.325 amounts to ¥10,000 after 13 years.

Answer:

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Exercises:

1- Find the future value and interest of BD2500 invested in a bank, at the end of 20 years at 5.25% annually.

Answer:

$$FV = PV \times (1+i)^n$$

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$$CI = FV - PV$$

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2- Find the future value and compound interest for BD1500 invested at 6.25% annually for 25 years.

Answer:

$$FV = PV \times (1+i)^n$$

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....

$$CI = FV - PV$$

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3- Find the future value for BD8,750 invested for 10 years, if you know that the rate is changing as follows: 5% annually for the first 5 years, 5.25% annually for the sixth year, 5.5% annually for the remaining years.

Answer:

$$FV = PV \times (1+i)^n$$

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4- Ahmed invested BD7,400 at 6.5% annually, find the future value after 8.5 years.

Answer:

$$FV = PV \times (1+i)^n$$

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5- Moayed deposited BD1400 at 6% annually, find the future value at the end of 10 years and 8 months if you know that interest is compounded quarterly.

Answer:

n = ……………………………………………………………………………..
I = ……………………………………………………………………………..

$$FV = PV \times (1+i)^n$$

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6- Shahd invested BD6000 at 10% annually compounded semi- annually. Find the future value at the end of 4 years and 5 months.

Answer:

n = ……………………………………………………………………………..
I = ……………………………………………………………………………..

$$FV = PV \times (1+i)^n$$

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7- Malak invested BD3150 at 2¼% every semi – annual, find the future value at the end of 4 years and 7 months.

$\quad$ **Answer:**

$\quad$ n = ………………………………………………………………………..

$\quad$ I = ………………………………………………………………………..

$\quad$ **FV = PV × (1+ i)^n**

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8- Omar borrowed BD6,000 from BBK for 5 years at 4% annually compounded semi-annually. Two years including the borrowing date, he borrowed BD2,980.600 at 2% annually compounded quarterly. How much would he will pay after 5 years from first borrowed date?

$\quad$ **Answer:**

CA for the first …. years

FV1 = PV1 × (1+ i)^n

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The balance after deposit

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CA for the rest …. years

n = …………………..

I = …………………..

FV2 = PV2 × (1+ i)^n

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9- How long will it take the money to triple itself at 6.75% annually?

Answer:

$\quad$ **(1+ i)^n = FV ÷ PV**

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10- Jassim deposited money in BBK for investment at 5% annually, after 5 years he added BD 723.718 to his account at a new interest rate of 5.5% annually. After 3 years, his account was BD2153.781. Find the first sum deposited.

Answer:

$PV2 = FV2 \div (1+i)^n$

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$FV1 =$ ……………………………………………………………………

$PV1 = FV1 \div (1+i)^n$

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Unit 2
Annuities &
Amortization Loan

Text book Exercises

Exercises: page 68

1- Ahmed paid an annuity of BD400 at the end of each year for 7 years at an interest rate of 3% annually. Find the following:

   a- Future value (amount) and interest at the end of the period.

   b- Present value (amount) at the end of the period.

Answer:

  a- $FVn = PMT \times [\frac{(1+i)^n - 1}{i}]$

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  b- $PVn = PMT \times [\frac{1-(1+i)^{-n}}{i}]$

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2- A trader paid an annuity of BD600 at the beginning of each three months at an interest rate of 6% annually. Find the following:

  a- Future value (amount) and interest at the end of 10 years.

  b- Present value of the annuities at the end of the period

Answer:

No. of annuities (n) = ...

Partial rate (i) =..

  a- $FVn = PMT \times [\frac{(1+i)^n - 1}{i}]$

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  CI = FVn - $(PMT \times n)$

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b- $PVn = PMT \times [\frac{1-(1+i)^{-n}}{i}]$

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3- Calculate the future value and interest of an ordinary annuity of BD800 paid 4 times a year for 6 years if the nominal rate is 4% annually.

Answer:

No. of annuities (n) = 6 × 4 = 24

Partial rate (i) = 4 ÷ 4 = 1%

$$FVn = PMT \times [\frac{(1+i)^n - 1}{i}]$$

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$CI = FVn - (PMT \times n)$

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4- At the beginning of every 4 months, Nasser deposited an annuity in a bank for 7 years at 9% annually. If the accumulated fund for him became $ 3249.048. Find how much Nasser deposited every 4 months.

Answer:

No. of annuities (n) = …………………………………………………

Partial rate (i) = …………………………………………………

$$FVn = PMT \times [\frac{(1+i)^n - 1}{i}] \times (1+i)$$

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5- Rayan deposited at the middle and at the end of each year an equal payment for 10 years at 5% annually. If the total amount of annuities at the end of the period was BD5236.664. Find the value of each annuity.

Answer:

No. of annuities (n) = …………………………………………..

Partial rate (i) =…………………………………………………..

$$FVn = PMT \times [\frac{(1 + i)^n - 1}{i}]$$

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6- What semi – annually payment will accumulate to BD1080.549 in five years at 8% annually compounded semi- annually?

Answer:

No. of annuities (n) = …………………………………………..

Partial rate (i) =…………………………………………………..

$$FVn = PMT \times [\frac{(1 + i)^n - 1}{i}]$$

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7- Bilal paid an annuity at the end of every year at 6% annually if the amount of annuities after 10 years was BD922.656. Find the value of each annuity.

$$FVn = PMT \times [\frac{(1 + i)^n - 1}{i}]$$

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Exercises: page 75

1- Salman paid an annuity of BD250 at the end of each three months for 9 years at an interest rate of 4% quarterly. Find the following:

   a- Future value (amount) and interest at the end of the period.

   b- Present value (amount) at the end of the period.

Answer:

a- $FVn = PMT \times [\frac{(1+i)^n - 1}{i}]$

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$CI = FVn - (PMT \times n)$

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b- $PVn = PMT \times [\frac{1-(1+i)^{-n}}{i}]$

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2- A trader paid an annuity of BD900 at the beginning of each six months at an interest rate of 5% annually compounded semiannually.

   Find the following:

     a- Future value (amount) and interest at the end of 8 years.

     b- Present value of the annuities at the end of the period.

Answer:

     No. of annuities (n) = ……………………………………..

     Partial rate (i) =……………………………………………

a- $FVn = PMT \times [\frac{(1+i)^n - 1}{i}] \times (1+i)$

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$$\text{CI} = FVn \ - (PMT \times \text{n})$$

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b- $PVn = PMT \times [\frac{1-(1+i)^{-n}}{i}] \times (1+i)$

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3- Calculate the future value and interest of an annuity due of BD800 paid 6 times a year for 5 years if the nominal rate is 3.5% annually.

Answer:

No. of annuities (n) = ……………………………………………………..

Partial rate (i) =…………………………………………………………

$FVn = PMT \times [\frac{(1+i)^n-1}{i}] \times (1+i)$

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4- Sajeda deposits a sum of money at the beginning of each year at 4% annually and the amount of annuity became BD1872.96 after 10 years. What was the value of each annuity?

Answer:

$FVn = PMT \times [\frac{(1+i)^n-1}{i}] \times (1+i)$

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5- Awatef paid at the end of each year sum of money at 2% annually so that the amount of annuities after 11 years was BD973.496. What was the value of each annuity?

Answer:

$$FVn = PMT \times [\frac{(1+i)^n - 1}{i}]$$

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6- Qassim deposits an equal annuity at the beginning of each year in his fund. The compound interest rate is 2.5% per annum and his balance at the end of 10 years was BD746.428. Find the value of each annuity.

Answer:

$$FVn = PMT \times [\frac{(1+i)^n - 1}{i}] \times (1+i)$$

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7- Abdulla took a loan of BD20,000 from a bank by compound interest rate 12% annually for 8 years, compounded interest every 4 months.

Answer:

No. of annuities (n) = ………………………………………………………

Partial rate (i) =………………………………………………………

$$PVn = PMT \times [\frac{1 - (1+i)^{-n}}{i}]$$

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8- Find the thirdly payment and prepare amortization loan schedule for first two years (first six payments).

year	beginning principal	annual payment	interest expense	principal reduction	remaining principal
1					
2					
3					
4					
5					
6					

9- Find the annually payment and prepare amortization loan schedule for four years, if the loan is BD30,000 for 4 years at compound interest rate 5% annually.

Answer:

$$PVn = PMT \times [\frac{1-(1+i)^{-n}}{i}]$$

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year	beginning principal	annual payment	interest expense	principal reduction	remaining principal
1					
2					
3					
4					
total					

10- You are required to prepare amortization loan schedule for a BD40,000 loan to be repaid in equal instalments at the end of each of the next three years. The interest rate is 9% annually, compounded interest semiannually.

Answer:

No. of annuities (n) = ...

Partial rate (i) =...

$$PVn = PMT \times [\frac{1 - (1 + i)^{-n}}{i}]$$

....

....

....

year	beginning principal	annual payment	interest expense	principal reduction	remaining principal
1					
2					
3					
4					
5					
6					
total					

11- Sara borrowed BD85,000 from a bank by compound interest rate 6% annually for 5 years. Find the annual payment and prepare amortization loan schedule for first five years.

Answer:

$$PVn = PMT \times [\frac{1 - (1 + i)^{-n}}{i}]$$

....

....

....

year	beginning principal	annual payment	interest expense	principal reduction	remaining principal
1					
2					
3					
4					
5					
total					

12- Your family is planning to borrow BD110,000 to purchase a new house on 10-years,8% annual payment. What is the annual payment and prepare amortization loan schedule for the first four years?

Answer:

$$PVn = PMT \times \left[\frac{1-(1+i)^{-n}}{i}\right]$$

$$110{,}000 = PMT \times \left[\frac{1-(1.08)^{-10}}{0.08}\right]$$

$$110{,}000 = PMT \times 6.7101$$

$$PMT = 16{,}392.93$$

year	beginning principal	annual payment	interest expense	principal reduction	remaining principal
1	110,000.00	16,392.93	8,800.00	7,592.93	102,407.07
2	102,407.07	16,392.93	8,192.57	8,200.36	94,206.71
3	94,206.71	16,392.93	7,536.54	8,856.39	85,350.32
4	85,350.32	16,392.93	6,828.03	9,564.90	75,785.42
5					
6					
7					
8					
9					
10					
total					

Unit 3

Capital Budgeting
Decision Model

Text book Exercises

Exercises: page 99

Exercises (3-1):

The following three projects" their cash flow and using 8% discount rate.

Cash Flow	Project A BD	Project B BD	Project C BD
Cost (Initial Investment)	**20,000**	**20,000**	**20,000**
Cash flow year 1	6,000	8,000	3,000
Cash flow year 2	6,000	7,500	4,000
Cash flow year 3	6,000	6,000	5,000
Cash flow year 4	6,000	5,000	6,000

REQUIRED:

Which projects do you accept, and which projects do you reject by using:

- a- Payback Period Method.
- b- Net Present Value Method.
- c- Profitability Index Method.

Answer:

a- Payback period methods

Project (A) – fixed cash flow

$$\text{Payback Period} = \frac{Cost\ (Initial\ Investment)}{Annual\ Cash\ inflow}$$

Payback Period =... ... ...

Project (B) – Changeable cash flow

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			
4			

Project (C) – Changeable cash flow

Years	Cash flow BD	Yet to be recovered BD	Payback period Years
0			
1			
2			
3			
4			

- **I will choose project ………. because …………………………..**

b- <u>Net present value method</u>

> **<u>Project (A) – fixed cash flow</u>**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	<u>PV of Cash flow</u>
0			
1			
2			
3			
4			

NPV = ………………………..   (Accept or Reject)

<u>OR (using table)</u>

PV n = ………………………………………………………

NPV = ………………………………………………………

PRESENT VALUE OF ORDINARY ANNUITY
(annuity in arrears -- end of period payments)

Periods	0.25%	0.50%	0.75%	1.00%	1.50%	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%
1	0.99751	0.99502	0.99256	0.99010	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593
2	1.99252	1.98510	1.97772	1.97040	1.95588	1.94156	1.92742	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326
3	2.98506	2.97025	2.95556	2.94099	2.91220	2.88388	2.85602	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710
4	3.97512	3.95050	3.92611	3.90197	3.85438	3.80773	3.76197	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213
5	4.96272	4.92587	4.88944	4.85343	4.78264	4.71346	4.64583	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271

➢ **Project (B) – Changeable cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

NPV = …………………………..   (Accept or Reject)

➢ **Project (C) – Changeable cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

- NPV = …………………………..   (Accept or Reject)
- **I will choose project (……..) because ……………………………**

c- Profitability index methods

➢ **Project (A) – fixed cash flow**

……………………………………………….(Accept or Reject)

➢ **Project (B) – Changeable cash flow**

……………………………………………….(Accept or Reject)

➢ **Project (C) – Changeable cash flow**

……………………………………………….(Accept or Reject)

▪ I will choose project (……..) , because …………………………...

Exercises (3-2):

What are the payback periods projects R, S and T? Assume all the cash flow is evenly spread throughout the year. If the cutoff period is three years, which projects do you accept?

Cash Flow	Project R BD	Project S BD	Project T BD
Cost (Initial Investment)	**12,000**	**15,000**	**10,000**
Cash flow year 1	5,000	4,000	7,000
Cash flow year 2	8,000	6,500	3,500
Cash flow year 3	9,000	7,000	3,000

Answer:

Project (R)

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			

Project (S)

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			

Project (T)

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			

I will choose project (…..) because ………………………………………...

Exercises (3-3):

Mona Company has three projects, given discount rates and future cash flow of each project. Calculate the net present value of each project and identify which project do you accept?

Cash Flow	Project E BD	Project F BD	Project G BD
Cost (Initial Investment)	14,000	18,000	22,000
Cash flow year 1	3,200	9,100	5,700
Cash flow year 2	4,800	7,450	5,700
Cash flow year 3	5,300	7,000	6,250
Cash flow year 4	6,900	5,800	7,700
Discount rate	6%	7%	8%

Answer:

Project (E)

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

- NPV = ………………………….. (Accept or Reject)

Project (F)

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

- NPV = …………………………..   (Accept or Reject)

Project (G)

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

- NPV = …………………………..   (Accept or Reject)
- **I will choose project (…..) because ……………………………..**

Exercises (3-4):

Given the discount rates and future cash flow of each project listed. Use the profitability index method and identify which project do you accept.

Cash Flow	Project A BD	Project B BD	Project C BD
Cost (Initial Investment)	16,000	16,000	16,000
Cash flow year 1	5,000	6,200	3,650
Cash flow year 2	5,000	5,350	3,600
Cash flow year 3	5,000	5,150	4,550
Cash flow year 4	5,000	4,400	4,750
Discount rate	4%	5%	6%

Answer:

Project (A) - Using table

PRESENT VALUE OF ORDINARY ANNUITY
(annuity in arrears -- end of period payments)

RATE PER PERIOD

Periods	0.25%	0.50%	0.75%	1.00%	1.50%	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%
1	0.99751	0.99502	0.99256	0.99010	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593
2	1.99252	1.98510	1.97772	1.97040	1.95588	1.94156	1.92742	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326
3	2.98506	2.97025	2.95556	2.94099	2.91220	2.88388	2.85602	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710
4	3.97512	3.95050	3.92611	3.90197	3.85438	3.80773	3.76197	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213
5	4.96272	4.92587	4.88944	4.85343	4.78264	4.71346	4.64583	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271

PV n = ……………………………………………………….

NPV = ……………………………………………………….

PI = ……………………………………………………….

Project (B)

Year	Cash Flow (CF)	$\times (1+i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

PI = ……………………………………………….(Accept or Reject)

Project (C)

Year	Cash Flow (CF)	$\times (1+i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

PI = ……………………………………………….(Accept or Reject)

I will choose project (……….) because …………………………………….

Exercises (3-5):

Abdulla Company has three potential projects, all with an initial cost of BD 30,000. Given the discount rates and future cash flow of each project. Which project do you accept? By using:

   a- Payback Period Method.
   b- Net Present Value Method.
   c- Profitability Index Method.

Cash Flow	Project R BD	Project S BD	Project T BD
Cash flow year 1	10,000	13,500	7,300
Cash flow year 2	10,000	12,000	8,800
Cash flow year 3	10,000	10,500	9,750
Cash flow year 4	10,000	7,200	11,600
Cash flow year 5	10,000	6,500	14,000
Discount rate	5.50%	5.50%	5.50%

Answer:

a- Payback period methods

Project (R) – fixed cash flow

$$\text{Payback Period} = \frac{Cost\ (Initial\ Investment)}{Annual\ Cash\ inflow}$$

Payback Period = ...

Project (S) – Changeable cash flow

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			
4			
5			

Project (T) – Changeable cash flow

Years	Cash flow BD	Yet to be recovered BD	Payback period Years
0			
1			
2			
3			
4			
5			

- ▪ **I will choose project (…..) because ………………………………**

b- Net present value method:

➢ **Project (R) – fixed cash flow:**

Year	Cash Flow (CF)	$\times (1+i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			
5			

NPV = …………………………..   (Accept or Reject)

➢ **Project (S) – Changeable cash flow:**

Year	Cash Flow (CF)	$\times (1+i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			
5			

NPV = …………………………..   (Accept or Reject)

➢ **Project (T) – Changeable cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			
5			

- NPV = ………………………….. (Accept or Reject)

- **I will choose project (……) because ………………………………..**

c- Profitability index method:

➢ **Project (R) – fixed cash flow**

……………………………………………(Accept or Reject)

➢ **Project (S) – Changeable cash flow**

……………………………………………(Accept or Reject)

➢ **Project (T) – Changeable cash flow**

……………………………………………(Accept or Reject)

- **I will choose project (…..), because………………………………..**

Exercises (3-6):

ALAMAL Company has three potential projects, all with an initial cost of BD 75,000. Given the discount rates and future cash flow of each project. Which project do you accept? By using:

a- Payback Period Method.

b- Net Present Value Method.

c- Profitability Index Method.

Cash Flow	Project R BD	Project S BD	Project T BD
Cash flow year 1	30,000	15,500	25,000
Cash flow year 2	28,000	23,000	25,000
Cash flow year 3	24,000	30,500	25,000
Cash flow year 4	21,000	32,200	25,000
Discount rate	7.00%	7.50%	8.00%

Answer:

a- **Payback period methods**

Project (R) – Changeable cash flow

Years	Cash flow BD	Yet to be recovered BD	Payback period Year
0			
1			
2			
3			
4			

➢ **Project (S) – Changeable cash flow**

Years	Cash flow BD	Yet to be recovered BD	Payback period Years
0			
1			
2			
3			
4			

➢ **Project (T) – fixed cash flow :**

$$\text{Payback Period} = \frac{Cost \ (\ Initial \ Investment)}{Annual \ Cash \ inflow}$$

Payback Period = … … … … … … … … … … … … … … … … … … …

▪ **I will choose project (……) because ………………………...**

b- Net present value method

➢ **Project (R) – Changeable cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	**PV of Cash flow**
0			
1			
2			
3			
4			

NPV = ………………………..   (Accept or Reject)

➢ **Project (S) – Changeable cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

NPV = …………………………..   (Accept or Reject)

➢ **Project (T) – fixed cash flow**

Year	Cash Flow (CF)	$\times (1 + i)^{-n}$	PV of Cash flow
0			
1			
2			
3			
4			

NPV = …………………………..   (Accept or Reject)

OR (using table)

PV n = …………………………………………………………………

NPV = …………………………………………………………………

Periods	PRESENT VALUE OF ORDINARY ANNUITY (annuity in arrears -- end of period payments)

Periods	0.25%	0.50%	0.75%	1.00%	1.50%	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%
1	0.99751	0.99502	0.99256	0.99010	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593
2	1.99252	1.98510	1.97772	1.97040	1.95588	1.94156	1.92742	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326
3	2.98506	2.97025	2.95556	2.94099	2.91220	2.88388	2.85602	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710
4	3.97512	3.95050	3.92611	3.90197	3.85438	3.80773	3.76197	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213
5	4.96272	4.92587	4.88944	4.85343	4.78264	4.71346	4.64583	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271

▪ **I will choose project (…..) because ……………………………….**

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c- Profitability index methods

> **Project (R) – fixed cash flow**

……………………………………………(Accept or Reject)

> **Project (S) – Changeable cash flow**

……………………………………………(Accept or Reject)

> **Project (T) – Changeable cash flow**

……………………………………………(Accept or Reject)

▪ I will choose project (….), because ……………………………...
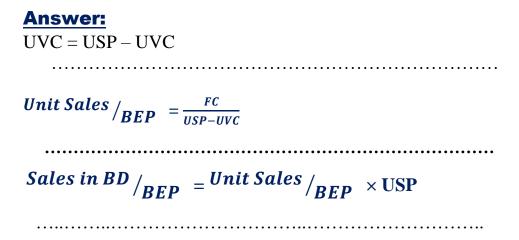
Unit 4

Break-even Analysis

Text book Exercises

Exercises: page 115

Exercise (4-1):

AL Huda Company sell's office disk for BD30 each and estimated variable costs are expected to be 70% of sales. If the company's fixed costs are BD360,000.

Required:

1- How many office disk must the company sell to break-even?
2- Compute sales revenue for break-even.

Answer:

UVC = USP – UVC

…………………………………………………………………………

$$Unit\ Sales/_{BEP} = \frac{FC}{USP-UVC}$$

…………………………………………………………………………

$$Sales\ in\ BD/_{BEP} = Unit\ Sales/_{BEP} \times USP$$

…..………..…………………………..…………………………..

Exercise (4-2):

Some financial data for each of three firms are as follow:

Title	Ahmed's Company	Osama's Company	Abdulla's Company
Selling price per unit	BD100	BD90	BD150
Variable cost per unit	BD80	BD60	BD120
Fixed Cost	BD140,000	BD120,000	BD180,000
Target Operating Income	BD60,000	BD30,000	BD90,000
Unit Sold	8,000 units	7,000 units	9,000 units

Required:

1- What is the break-even point in units and sales revenue for each company?

2- What is the units and sales revenue to get target profit?

3- What is the margin of safety in units?

4- Answer:

Ahmed's Company

$1 -$ $Unit\ Sales/_{BEP} = \frac{FC}{USP-UVC}$

………………………………………………………………………………….

$Sales\ in\ BD/_{BEP} = Unit\ Sales/_{BEP} \times USP$

… …………………………………………………………………………

$2 -$ $Unit\ Sales/_{Target\ Income} = \frac{FC+TOI}{USP-UVC}$

………………………………………………………………………………

$Sales\ in\ BD/_{Target\ Income} = Unit\ Sales/_{Target\ Income} \times USP$

…………………………………………………………………………..

3- **Margin of Safety = Actual Unit Sales - Break-even point sales in units**

……………....……………………………………………………………….

Exercise (4-3):

Zeyad Corporation manufactures a line of computer, the average selling price of its finished product is BD180 per unit. The variable cost per unit is BD110. Zeyad incurs fixed costs of BD630,000.

Required:

1- What is the break-even point in units for the company?

2- What is the sales revenue the firm must achieve to reach the break-even point?

Answer:

$$Unit\ Sales/_{BEP} = \frac{FC}{USP-UVC}$$

……………………………………………………………………………..

$$Sales\ in\ BD/_{BEP} = Unit\ Sales/_{BEP} \times USP$$

……………………………………………………………………………..

Exercise (4-4):

Footwear Company manufactures a complete line of men's and women's dress shoes for independent merchants. The average selling price of its finished products is BD85 per pair. The variable cost for this same pair of shoes is BD58. Footwear has fixed costs of BD270,000 per year.

Required:

1- What is the break-even point in " pair of shoes" for the company?
2- What is the sales revenue the firm must achieve to reach the break-even point?
3- If fixed cost increased to BD297,000. What is the new break-even point in pair of shoes and sales revenue?

Answer:

1- $Unit\ Sales/_{BEP}$ = …………………………………….………………..

2- $Sales\ in\ BD/_{BEP}$ = …………………………………………

3- $Unit\ Sales/_{BEP}$ = …………………………………….………………..

$Sales\ in\ BD/_{BEP}$ = …………………………………………

Exercise (4-5):

Fahad Radios manufactures a complete line of radio and communication equipment. The average selling price of its finished products is BD180 per unit. The variable cost for these units is BD126. Fahad Radios incurs fixed costs of BD540,000 per year.

Required:

1- What is the break-even point in radio and communication equipment for the company?

2- What is the sales revenue the firm must achieve to reach the break-even point?

3- What would be the firm's profit or loss at the following units of production sold: 12,000 units? 15,000 units? 20,000 units?

Answer:

1 – $Unit\ Sales/_{BEP}$ = … … … … … … … … … … … … … .. … … … … …

2- $Sales\ in\ BD/_{BEP}$ = ………………………………………….

3- Profit/Loss = Units Sales × (Selling price per unit − Variable cost per unit) – Fixed Costs

Profit/Loss = [$Q\times$ (USP − UVC)] - FC =

Profit/Loss (12000 Units) = ……………………………………………

…………………………………………………………………………..

Profit/Loss (15000 Units) = ……………………………………………

……………………………………………………………..……….

Profit/Loss (20000 Units) = ……………………………………………

………………………………………………………………….

Exercise (4-6):

Osama Company expects to earn BD40,000 next year. Sales will be BD400,000, its average product sells for BD20 per unit. The variable cost per unit is BD8.

Required:

1- What are the company's fixed costs expected to be next year?

2- Calculate the company's break-even point in units and sales revenues?

Answer:

1- Profit/Loss = [$Q \times$ (USP – UVC)] - FC =

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

$2 - $ Unit Sales $/_{BEP}$ = … … … … … … … … … … … … … … … … … ..

Sales in BD $/_{BEP}$ = …………………………………………………

Exercise (4-7):

Hamad Company manufactures a full line of lawn furniture. The average selling price of its finished products is BD25 per unit. The associated variable cost for these units is BD15. Fixed costs of BD50,000 per year.

Required:

1- What is the break-even point in units for the company?

2- What is the sales revenue the firm must achieve to reach the break-even point?

3- What would be the firm's profit or loss at the following units of production sold: 4,000 units? 6,000 units? 8,000 units?

4- How many units must be sell to earn an operating income of BD30,000.

5- Compute sale revenue needed to earn an operating income of BD30,000.

Answer:

$1 - $ $Unit\ Sales/_{BEP}$ = … … … … … … … … … … … … … … … … … …

2- $Sales\ in\ BD/_{BEP}$ = ……………………………………………..

3- Profit/Loss = [$Q×$ (USP – UVC)] - FC =

Profit/Loss (4000 Units) = ……………………………………………………

……………………………………………………………………………………...

Profit/Loss (6000 Units) = ……………………………………………………

…………………………………………………………………………………..

Profit/Loss (8000 Units) = ……………………………………………………

4- **Sales in units to earn income** = $\dfrac{\textbf{Fixed Cost +Target Operating Income}}{\textbf{Selling price per unit − Variable cost per unit}}$

$$Unit\ Sales/_{Target\ Income} = \frac{FC+TOI}{USP-UVC}$$

……………………………………………………………………

5-

$$Sales\ in\ BD/_{Target\ Income} = Unit\ Sales/_{Target\ Income} \times USP$$

……………………………………………………………………

Exercise (4-8):

Al Ahmed Company manufactures and sells pens. Currently, 5,000,000 units are sold per year at BD0.5 per unit. Fixed costs are BD900,000 per year. Variable costs are BD0.30 per unit.

Required: consider each case separately

1- a. What is the current annual profit or loss?

b. What is the present break-even in units and revenues?

2- Compute the new profit or loss for each of the following changes:

a. A BD0.04 per unit increase in variable costs.

b. A 10% increase in fixed costs.

c. A 20% decrease in selling price.

3- Compute the new break-even point in units and revenues for each of the following changes:

    a. A 20% increase in variable cost per unit.

    b. A BD20,000 increase in fixed costs.

<u>Answer:</u>

1- a- Profit/Loss = [$Q \times$ (USP – UVC)] - FC

……………………………………………………………

    b- $Unit\ Sales / BEP$ = ……………………………………………

        $Sales\ in\ BD / BEP$ = ……………………………………

2- Profit/Loss = [$Q \times$ (USP – UVC)] - FC

a- Profit/Loss = ………………………………………………………

    UVC = ………………………………………………………………

b- Profit/Loss = ……………………………………………………..

    FC = ……………………………………………………………

c- Profit/Loss = ………………………………………………………

    USP = ………………………………………………………..

3- a- $Unit\ Sales / BEP$ = ………………………………………………

   UVC = ……………………………………………………………

    $Sales\ in\ BD / BEP$ = ……………………………………

  b- FC = …………………………………………………………..

  $Unit\ Sales / BEP$ = ……………………………………………

  UVC = ……………………………………………………………..

    $Sales\ in\ BD / BEP$ = ……………………………………

Unit 5

Financial Ratio

Analysis

Textbook Exercises

Activity 5-2-1:

▸ MTA Wholesalesalers is a limited company operating in Bangladesh. It has been operating successfully for over 11 years. Below are some key results from its financial statements for the last two years.

MTA wholesalers Pvt Ltd Summarized results from financial statements		
	Year 10 BD (000)	**Year 11 BD (000)**
Revenue	400	420
Cost of sales	240	252
Gross profit	160	168
Overheads	130	147
Profit for the year	30	21
Capital employed	200	210

Required:

From the information presented calculate each year the company's:

- Gross Profit.
- Gross Profit Margin %.
- ROCE%.

Answer:

➢ **Gross Profit = Revenue - Cost of sales**

Gross profit year 1= ……………………………………

Gross profit year 2= ……………………………………

➢ **Gross profit margin (%) = $\frac{\text{Gross profit}}{\text{Revenue}} \times 100$**

Gross profit margin year1 = …………………………………….

Gross profit margin year2 = …………………………………….

➤ **ROCE (%) =** $\dfrac{\textbf{Profit before tax}}{\textbf{Capital Employed}} \times \textbf{100}$

Profit before tax year1 = Gross profit – Expenses

……………………………………………..

Profit before tax year2 = Gross profit – Expenses

……………………………………………..

ROCE year1= ………………………………………………………….

ROCE year2= ………………………………………………………….

Exercises:

Exercise (5-1):

The following results were extracted from statements of financial position prepared for Abdulla's Company at the end of years 2018 and 2019.

Abdulla's Company Summarized results from financial statements at 31 December		
	Year 2018 BD (000)	**Year 2019 BD (000)**
Cash	50	80
Inventories	40	60
Account Receivable	30	20
Total Current Assets	**120**	**160**
Account payable	15	20
Bank Overdraft	10	30
Total Current Liabilities	**25**	**50**
Total Assets	**300**	**350**

Required:

From the information presented calculate for the company's each year its:

1- Working Capital.

2- Capital Employed.

3- Current Ratio.

4- Acid Test Ratio (Quick Ratio)

Answer:

(1) Working capital year1 = Current Assets – Current Liabilities

……………………………………………

Working capital year2= …………………………………………….

(2) Capital employed year1 = Total assets – current liabilities

= ……………………………………...

Capital employed year 2 = ……………………………….…

(3) Current Ratio year 1 $= \dfrac{current\ assets}{current\ liabilities} =$ … … … … … … … … …. … ..

Current Ratio year 2 = … … … … … … … … … … … … … … … … ….. … ....

(4) Quick Ratio year 1 $= \dfrac{current\ assets - inventory}{current\ liabilities} =$ … … … … … … … … … ..

Quick Ratio year 2 = … … … … … … … … … … … … … … … … … … ….

Exercise (5-2):

The following as the income statements for Salman Company for years 2019 and 2020.

Required:

From the information presented, calculate for the company's each year its:

1- Gross Profit Margin %.

2- Profit Margin %.

3- Return on Capital Employed (%).

If Capital Employed:

2019 = 320 & 2020 = 337.5

Salman Company Income Statements	BD million	
	Year 2019	Year 2020
Revenue	500	900
less cost of sales	300	450
Gross profit	**200**	**450**
less expenses	40	225
Profit before tax	**160**	**225**
less tax	60	80
Profit after tax	**100**	**145**

Answer:

1- Gross profit margin (%) = $\dfrac{\text{Gross profit}}{\text{Revenue}} \times 100$

Gross profit margin year 1 = ...
Gross profit margin year 2 = ...

2- Profit margin (%) = $\dfrac{\text{Profit before tax}}{\text{Revenue}} \times 100$

Profit margin year 1 = ...

Profit margin year 2 = ...

3- ROCE%= $\dfrac{profit\ before\ tax}{capital\ employed} \times 100$

ROCE 2019= ... ...

ROCE 2020= ... ...

Exercise (5-3):

The balance sheet and income statement for MRG Company are as

Balance Sheet	BD 000
Cash	500
Account Receivable	2,000
Inventories	1,000
Current Assets	**3,500**
Fixed Assets	4,500
Total Assets	**8,000**
Current Liabilities	2,000
Long-term debt	2,000
Owners' Equity	4,000
Total Liabilities and equity	**8,000**

Income Statement	BD 000
Net Sales (Revenues)	8,000
- Cost of Goods Sold	3,200
Gross Profit	**4,800**
- Operating Expenses	800
Operating Income	**4,000**
Interest Expenses	1,000
Profits before taxes	**3,000**
Tax (5%)	150
Net Income	**2,850**

Required:

Calculate the following ratios:

1- Gross Profit Margin %.
2- Profit Margin %.
3- Return on Capital Employed (%).

4- Working Capital.
5- Capital Employed.
6- Current Ratio.
7- Acid Test Ratio (Quick Ratio).

Answer:

1- **Gross profit margin (%) =** $\dfrac{\text{Gross profit}}{\text{Revenue}} \times 100$ = … … … … … … … …

2- **Profit margin (%) =** $\dfrac{\text{Profit before tax}}{\text{Revenue}} \times 100$ = … … … … … … … …..

3- **ROCE%=** $\dfrac{\text{profit before tax}}{\text{capital employed}} \times 100$

Capital employed = Total assets – Current liabilities

…………………………………………………………..

ROCE = … ..

4- **Working Capital =** …………………………………………………

5- **Capital employed = Total assets – Current liabilities**

= …………………………………………………

6- **Current Ratio** = … ..

7- **Acid Test Ratio (Quick Ratio).** = … … … … … … … … … … … … … … … ….

Exercise (5-4):

The annual sales for Sara Company were BD4.5 million last year, and the value of inventories was BD 120,000. The firm's end-of-year balance sheet and income statement appeared as follows:

Balance Sheet	BD 000
Current Assets	500,000
Net Fixed assets	1,500,000
Total assets	2,000,000
Current liabilities	400,000
Owner's Equity	1,600,000
Total liabilities and Equity	2,000,000

Income Statement	BD
Sales (Revenues)	4,500,000
- Cost of Goods Sold	3,500,000
Gross Profit	**1,000,000**
- Operating Expenses	(500,000)
Operating Income	**500,000**
Interest Expenses	100,000
Profits before taxes	**400,000**
Tax (5%)	20,000
Net Income	**380,000**

Required:

Calculate the following ratios:
1. Gross Profit Margin %.
2. Profit Margin %.
3. Return on Capital Employed (%).
4. Working Capital.
5. Capital Employed.
6. Current Ratio.
7. Acid Test Ratio (Quick Ratio).

Answer:

1- Gross Profit Margin % =… … … … … … … … … … … … … … … … … … … ….

2- Profit Margin %. = …

3- Capital Employed = …………………………………………………

   ROCE= … ..

   4- Working capital = Current Assets – Current Liabilities

   …………………………………………………………………

5- **Capital Employed** = ……………………………………………

6- **Current Ratio** = … … … … … … … … … … … … … . … … … … … … … …

7- **Acid Test Ratio (Quick Ratio).** = … … … … … … … … … … … … … …

Exercise (5-5):

Balance Sheet	BD 000
Cash	1,000
Account Receivable	1,500
Inventories	1,000
Current Assets	3,500
Fixed Assets	4,500
Total Assets	8,000
Account Payable	1,000
Accrued Expenses	800
Total Current Liabilities	1,800
Long-term debt	2,100
Owners' Equity	4,100
Total Liabilities and equity	8,000

Income Statement	BD 000
Net Sales (Revenues)	8,000
- Cost of Goods Sold	3,200
Gross Profit	4,800
- Operating Expenses	800
Operating Income	4,000
Interest Expenses	1,000
Profits before taxes	3,000
Tax (5%)	150
Net Income	2,850

Required:

Calculate the following ratios:

1- Gross Profit Margin %.

2- Profit Margin %.

3- Return on Capital Employed (%).

4- Working Capital.

5- Capital Employed.

6- Current Ratio.

7- Acid Test Ratio (Quick Ratio).

Answer:

1- **Gross Profit Margin %** = … … … … … … … … … … … … … . . … … … … … … ..

2- **Profit Margin %.** = …

3- **Capital employed** = ………………………………………………..

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ROCE = … . . … ..

4- **Working capital** = ……………………………………………………

5- **Capital employed** = …………………………………………………..

6- **Current Ratio** =… ....

7- **Acid Test Ratio (Quick Ratio).** … … … … … … … … … … … … … … … … ...

Exercise (5-6):

Income Statement	2017 BD000	2018 BD000	2019 BD000	2020 BD000
Sales (Revenues)	3479	3644	3225	2,900
- Cost of Goods Sold	2109	2255	1997	1,746
Gross Profit	**1370**	**1389**	**1228**	**1,154**
- Operating Expenses	1105	1113	1088	1,015
Operating Income	**265**	**276**	**140**	**139**
Interest Expenses	35	56	20	29
Profits before taxes	**230**	**220**	**120**	**110**
Tax (5%)	11.5	11	6	5.5
Net Income	**218.5**	**209**	**114**	**104.5**

Balance Sheet	2017 BD000	2018 BD000	2019 BD000	2020 BD000
Cash	201	327	339	309
Account Receivable	507	591	562	518
Inventories	635	545	564	315
Current Assets	**1343**	**1463**	**1465**	**1362**
Fixed Assets	313	323	291	378
Total Assets	**1656**	**1786**	**1756**	**1740**
Current Liabilities	432	517	557	612
Long-term debt	254	888	692	587
Owners' Equity	970	381	507	541
Total Liabilities and equity	**1656**	**1786**	**1756**	**1740**

Required:

Calculate the following ratios for each year:

1- Gross Profit Margin %.

2- Profit Margin %.

3- Return on Capital Employed (%).

4- Working Capital.

5- Capital Employed.

6- Current Ratio.

7- Acid Test Ratio (Quick Ratio).

Answer:

(1) Gross Profit Margin %

2017= ... ...

2018 = ...

2019 = ...

2020 = ...

(2) Profit Margin %

2017= ... ...

2018 = ...

2019 = ...

2020 = ...

(3) Capital employed = Total Assets – Current Liabilities

2017 = ……………………………………………….

2018 = ……………………………………………….

2019 = ……………………………………………..

2020 = ………………………………………………

ROCE 2017= ... ...

2018 = ...

2019 = ...

2020 = ...

(4) Working Capital= Current Assets - Current Liabilities

2017 = ……………………………………………….

2018 = ……………………………………………….

2019= ……………………………………………..

2020 = ………………………………………………

(5) Capital Employed 2017 = ……………………………………………

2018 = ……………………………………………

2019 = ……………………………………………….

2020 = ……………………………………………….

(6) Current Ratio $= \dfrac{Current\ Assets}{Current\ Liabilities}$

2017 = ….

2018 = ….

2019 = ….

2020 = …

(7) Quick Ratio $= \dfrac{Current\ Assets - Inventories}{Currnt\ Liabilities}$

2017 = … ..

2018 = …

2019 = … ..

2020 = … ..