FEEDBACK TUTORIAL LETTER

1st SEMESTER 2019

ASSIGNMENT 1

QUANTITATIVE METHODS
QTM511S
QUANTITATIVE METHODS 1 [QTM511S].
FEED BACK TUTORIAL LETTER
ASSIGNMENT 1 SEM-1 2019.

My dear student,
Congratulations on the successful completion of your first assignment for semester 1 2019. I am convinced the study guide have given you enough exposure to applicable quantitative methods and skills in financial circles.
I have no doubts that working through the questions must have in no small way improved on your statistical, analytical and other calculation skills.

The Marking Scheme or MEMO

MEMORANDUM OF QTM511S ASSIGNMENT 01 2019
Total Marks 67

Question 1 (10 marks)
From the statement of the problem we use the interest formula \( I=Prt \)

Where \( p = \frac{I}{rt \sqrt{}} \)

when \( I = N\$150.00 \), \( t = 6 \) months, \( r = 6% = 0.06 \)

\[ P = \frac{12 \times N\$150.00 \sqrt{1800}}{0.06 \times 6 \sqrt{0.36}} = N\$5,000 \]

Question 2 (10 marks)
For an amount of N\$1500 due in 15 months for an investment discounted at the rate of 11% annually
2.1 To calculate the simple discount on the amount use the formula \( D = A \sqrt{t} \) for \( A = N\$1500 \)
\( d = 11\% \), \( t = 15 \) months = 1.25 years\( \sqrt{\} \) applying the formula you have
\( D = N\$1500 \times 0.11 \sqrt{1.25} \sqrt{\} = N\$206.25 \sqrt{\} \)

(5)

2.2 To calculate the present value of the amount you must use the formula
\( P = A - D \sqrt{\} = N\$1500 \sqrt{- N\$206.25} \sqrt{\} = N\$1293.75} \sqrt{\}

The simple discount on the amount is N\$206.25 and present value of the amount is N\$1293.75 \sqrt{\}

(5)

Question 3 (15 marks)
A woman had a note of N\$4,000 dated 15\textsuperscript{th} March 2007 with an interest rate of 4% The maturity date was 90 days after date. Two weeks later she took it to another bank that

discounted it for 6%. Follow the two steps in calculating the proceeds of the note.
Step 1 calculate the maturity value of the note using the formula \( A = P(1 + rt) \sqrt{\} \)
From the statement of the problem \( P = N\$4,000 \), \( r = 4\% = 0.04 \sqrt{\} \)
\( t = 90 \) days \( \sqrt{\} = \frac{90}{360} = \frac{1}{4} \) years \( \sqrt{\} \)

(5)
So \( A = N\$4,000 \sqrt{\sqrt{1 + 0.04 \times \frac{1}{4}} \sqrt{1 - 0.06 \times \frac{75}{360}}} = N\$4,000 \times 1.01 = N\$4,040 \) is the maturity value of the note.

**Step 2**

To calculate the proceeds of the note. Use the formula \( P = A(1-dt) \). From the statement of the problem we the following data \( A = N\$4,000, d = 6\% = 0.06, t = (90-15) = 75 \) days.

\[
P = N\$4040 \left(1 - 0.06 \times \frac{75}{360}\right) = N\$4,040 (1 - 0.0125)
\]

\[
= N\$3989.50
\]

So the proceeds of the note is \( N\$3989.50 \). \( \checkmark \) \( (15) \)

**Question 4 (10 marks)**

To calculate the effective interest rate using the information given by the problem

And the formula \( r_{eff} = \left(1 + \frac{r}{m}\right)^m - 1 \). In this problem \( r = 9\% = 0.09 \), and \( m = 12 \),

\[
r_{eff} = \left(1 + \frac{0.09}{12}\right)^{12} - 1 = (1 + 0.0075)^{12} - 1 = 9.38\% \checkmark \)

Is the effective interest rate of the transaction.

**Question 5 (12 marks)**

5.1 To find the amount of the annuity, use the formula

\[
S_n = R \left(\frac{(1+i)^n - 1}{i}\right)
\]

where \( R = N\$1000, r = 10\% = 0.10, m = 4, t = 5. \)

Applying the data, we calculate the interest per period and the total number of payment periods as follows.

\[
i = \frac{r}{m} = \frac{0.10}{4} = 0.025 \checkmark
\]

\[
n = mt = 4 \times 5 = 20 \checkmark
\]

Applying the formula we:

\[
S_n = N\$1000 \times \frac{(1 + 0.025)^{20} - 1}{0.025} = N\$1000 \times 25.5448 = N\$25,544.80 \checkmark
\]

5.2 To calculate the compound interest earned by the annuity. \( (12) \)
We use the formula

\[ I = S_n - nR \]

Applying this formula, we have

\[ I = N$25,544.80 - N$20,000.00 = N$5,544.80 \]

is the compound interest earned

Question 6 (10 marks)

To solve the system

\[ \begin{align*}
    x + y - t &= -2 \\
    2x - 2y + z &= 1 \\
    3y - 2z + t &= 5 \\
    x - z - 2t &= -4
\end{align*} \]

The augmented matrix of this system is

\[
\begin{pmatrix}
  1 & 1 & 0 & -1 & : & -2 \\
  2 & -2 & 1 & 0 & : & 1 \\
  0 & 3 & -2 & 1 & : & 5 \\
  1 & 0 & -1 & -2 & : & -4
\end{pmatrix}
\]

The first four columns are for \( x, y, z, \) and \( t \)

respectively. This matrix can be reduced to its echelon form to yield

\[
\begin{pmatrix}
  1 & 1 & 0 & -1 & : & -2 \\
  0 & -4 & 1 & 2 & : & 5 \\
  0 & 0 & -5 & 10 & : & 35 \\
  0 & 0 & 0 & -16 & : & -48
\end{pmatrix}
\]

Let's perform the backward substitution as

follows: From row 4, \(-16t = -48\) for \( t = 3 \)

From row 3 \( z = -1 \)

From row 2 \( y = 0 \) and from row 1 \( x = 1 \)

Hence the solution is \( x = 1, y = 0, z = -1, t = 3 \)

Most of you have performed creditably well and I recommend that you keep this up.

CONGRATULATIONS !!!.

Your Marker-Tutors

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