EGC
Eastern Goldfields College

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Mathematics Applications U1 2017

Investigation 1

Total Marks: 29 marks

Time allowed: 90 minutes

Calculator Assumed, No Notes permitted

Show ALL working. Marks are awarded for demonstrated understanding of concepts from the course, not for answers alone.

NANNA and POP WATTERS

Nanna and Pop Watters won $400 000 on lotto.
They decided to share it equally between their two children, Brian and Merle.

Nanna and Pop did not want the money squandered away. So they insisted the money be invested.

MERLE

Merle decided to put her $200 000 in a fixed-term saving account. These accounts pay higher interest than normal bank savings accounts, but the investor cannot take money out for the term of the investment.

She spoke to a finance broker who left her with three options to consider.

Option One:	**PIGGY BANK** offered an account at 7.5% pa compounded 6 monthly.
Option Two:	**RIVER BANK** offered 9.2% pa of the original amount invested for the term of the loan. (A simple interest offer)
Option Three:	**BANK SHARPLY** offered 7% pa compounded quarterly for two years.

Question 1:   [14 marks – 5, 3, 5, 1]

Examine each of the options carefully and then advise Merle which option would be best if she intends to invest for **2 years**. Use the tables below to show the value of her investment. <u>Only complete as many rows as you need.</u>

a) **Option One**:

	Principal	Interest (show calculation)	Balance
1	200 000	200 000 × 0.0375 = 7500 ✓	$207 500
2	207 500	207 500 × 0.0375 = 7781.25	$215 281.25 ✓
3	215 281.25	215 281.25 × 0.0375 = 8073.05	$223 354.30 ✓
4	22 3354.30	223354.30 × 0.0375 = 8375.79	$231 730.08 ✓
5		*(−1 incorrect rounding + paper)*	
6		*any errors −1 then F.T.*	

STOP *−1 if didn't stop.*

Total after 2 years is :

$231 730.08 ✓ *must be written here.*

b) **Option Two**:

$$S.I = 200\,000 \times 0.092 \times 2 \checkmark$$

$$= 36\,800 \checkmark$$

$$Total = \$236\,800$$

Total after 2 years is :

$$\$236\,800 \checkmark$$

c) **Option Three**:

	Principal	Interest (show calculation)	Balance
1	200 000	200 000 × 0.0175 = 3500	$ 203 500
2	203 500	203 500 × 0.0175 = 3561.25	207 061.25
3	207 061.25	207061.25 × 0.0175 = 3263.57	210 684.82
4	210 684.82	210684.82 × 0.0175 = 3686.98	214 371.81
5	214 371.81	214371.81 × 0.0175 = 3751.51	218 123.31
6	218 123.31	218123.31 × 0.0175 = 3817.16	221 940.47
7	221 940.47	221 940.47 × 0.0175 = 3883.96	225 824.43
8	225 824.43	225 824.43 × 0.0175 = 3951.93	229 776.36
9		−1 per error	
10		✓✓✓ working F/T.	

STOP

−1 if go to row 10

Total after 2 years is :

$$\$229\,776.36 \checkmark$$

If use 7%.
$343 637.24

d) What is the Best Option for Merle?

Option 2 <u>OR</u> Simple Interest.

✓ F.T.

Question 2 [2 marks]

Do you think your answer would be different if Merle invested for 5 years? Explain your answer.

NOTE: It is not necessary to recalculate the amounts to answer the question.

Must be
option 2

No, as higher interest will mean

more money is earned. (or similar)

→ else · Yes ✓ F.T.

Question 3 [3 marks]

BANK ONNIT offers 7%pa compounded weekly.
Would this be a better option than Bank Sharply over 2 years? Explain.

NOTE: It is not necessary to recalculate the amounts to answer the question.

Yes, as interest is compounded more frequently

and the rate + time are the same.

BRIAN

Brian purchases a truck for $200 000. He leases it to a trucking company for $1100 a week on the understanding that they fully maintain the vehicle.

Question 4   [2 marks]

How much money will Brian receive from the lease in 2 years?

$$1100 \times 52 \times 2 ✓$$

$$= \$114\ 400 ✓$$

Question 5   [6 marks – 4, 1, 1]

Brian's accountant gives him two choices for depreciation on the truck:

Original Value method: Brian can claim depreciation at 12% of the original value each year. (Like simple interest)

Diminishing value method: Brian can claim depreciation at 11% of the remaining value of the truck each year. (Like compound interest)

a) Find the **value of the truck** two years after Brian leased it out using the following depreciation methods:

(i) Original Value Method

$$200\ 000 \times 0.12 \times 2$$

$$= \$48\ 000 ✓$$

∴ Truck worth $152 000 ✓ $\left(200\ 000 - 48\ 000 \right)$

(ii) Diminishing Value Method

$$200\ 000 \times 0.89^{2} ✓$$ (OK)

$$= \$158\ 420 ✓$$

$200\ 000 \times 0.11$
$= 22\ 000$

$200\ 000 - 22\ 000 = 178\ 000$
$178\ 000 \times 0.11 = 19588$
$178\ 000 - 19588 = 158.420$

b) What method of depreciation should Brian use?

Diminishing Value Method ✓

c) What is his investment worth after 2 years?

$158420 + 114 400

= $272 820   ✓ ft

Question 6   [2 marks]

Whose investment is worth the most after 2 years, Brian's or Merle's, and by how much?

Brian's by $36 020.   ✓   ✓

ft

END OF INVESTIGATION