Eastern Goldfields College
Mathematics 1E 2014
Investigation 5 – Nanna & Pop Watters

Class time allocated: 90 minutes Name : SOLUTIONS

You have the opportunity to earn three bonus marks in this project:

	Possible score	Your score
Argument: formulae, use of equal signs (=), setting out	**2**	
Numbering and writing: easily read, spelling	**1**	

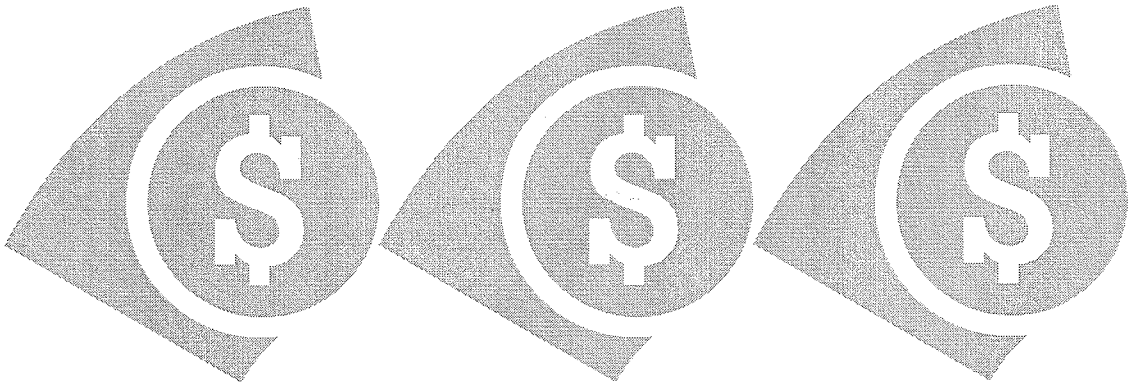
Total Marks
31

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.

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. Only complete as many rows as you need.

a) Option One:

	Principal	Interest (show calculation)	Balance
1	200 000	200000 × 0.0375 = 7500 ✓	$207 500 ✓
2	207500	207500 × 0.0375 = 7781.25	$215281.25 ✓
3	215281.25	215281.25 × 0.0375 = 8073.05	223354.30 ✓
4	223354.30	223354.30 × 0.0375 = 8375.79	231730.08 ✓
5			
6			

STOP ✓

(−1 incorrect wording for paper)

any errors −1 then FT.

Total after 2 years is : $231730.08 ✓ (−1 if continue for 6 rows)

b) Option Two:

S.I = 200000 × 0.092 × 2 ✓

= 36800 ✓

Total = 236800

Total after 2 years is : $236800 ✓

if use TVM $343637.24

c) Option Three:

	Principal	Interest (show calculation)	Balance
1	200000	200000 × 0.0175 = 3500 ✓	$203500
2	203500	203500 × 0.0175 = 3561.25	$207061.25
3	207061.25	207061.25 × 0.0175 = 3623.57	$210684.82
4	210684.82	210684.82 × 0.0175 = 3686.98	214371.81
5	214371.81	214371.81 × 0.0175 = 3751.51	218123.31
6	218123.31	218123.31 × 0.0175 = 3817.16	221940.47
7	221940.47	221940.47 × 0.0175 = 3883.96	225824.43
8	225824.43	225824.43 × 0.0175 = 3951.93	229776.36
9		✓✓ working	F/T.
10		−1 per error.	

STOP

Total after 2 years is : $ 229776.36 ✓ −1 if go to row 10.

d) The Best Option for Merle is :

F.T. Option 2 ✓ or Simple Interest.

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.

F.T. No, ✓ as higher interest will mean more money is earned (or similar) ✓

Must be Option 2.

If not 2 must say yes.

3. [2 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.

4. [2 marks]
How much money will Brian receive from the lease in 2 years?

1100 × 52 × 2 ✓

= $114 400 ✓

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)

5. [6 marks – 4, 2]

a) Find the **value of the truck** two years after Brian leased it out under **both** methods of depreciation.

OV 200 000 × 0.12 × 2

= 48 000 ✓

∴ Truck worth $152 000 ✓
(200 000 − 48 000).

DV 200 000 × 0.89² ✓

= $158 420 ✓

OR 200 000 × 0.11
= 22 000
200 000 − 22 000 = 178 000
178 000 × 0.11 = 19 588
178 000 − 19 588 = 158 420

b) What method of depreciation should Brian use and what is his investment worth after 2 years?

Brian should use diminishing value method ✓

$158420 + 114400 ✓
= $272820 F.T.

6. [2 marks]

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

Brian's by $36020 ✓ F.T.

END OF INVESTIGATION