

FORMULAS...

Simple Interest

$$I = Prt$$

$$A = P + I$$

$$A = P + Prt$$

$$A = P(1 + rt)$$

Compound Interest

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$I = A - P$$

Rule of 72 and Rate of Return

$$\text{Doubling Time} = \frac{72}{\text{Rate}}$$

$$\text{ROR} = \frac{\$ \text{earn}}{\$ \text{invested}} \times 100\%$$

Present Value

$$P = \frac{A}{\left(1 + \frac{r}{n} \right)^{nt}}$$

TVM-Solver

N =
I % =
PV =
PMT =
FV =
P / Y =
C / Y =
PMT : END BEGIN

PART A - Multiple Choice [14 Marks]

Circle the letter that corresponds to the correct solution.

1. Ms. Carr has just purchased a new SUV valued at \$38 000.00. The new SUV **depreciates** at a rate of 18 % per year. How much will the SUV be worth 3 years from now? 38000(0.82)³

C [A] \$12 666.67 [B] \$17 180.63 C [C] \$20 951.98 [D] \$25 551.98

2. Homer deposited \$1500 into a savings account where the money is to be compounded semi-annually at an interest rate of 8 % per year for 18 months. The amount after 18 months can be expressed as... 1500(1 + \frac{0.08}{2})^{2 \cdot \frac{18}{12}}

D [A] \$1500(1+0.08)³⁶ [B] \$1500(1+0.04)³⁶ [C] \$1500(1+0.08)³ D [D] \$1500(1+0.04)³

3. Bart has an account that pays interest at a rate of 5 % compounded monthly. He wishes to have \$3000 in that account in 2 years time. Bart decides to use the finance feature on the graphing calculator to determine his monthly payment. Which screen below shows the correct information required to calculate this value?

X [A] N = 24
I % = 5
PV = 3000
PMT =
FV = 0
P / Y = 12
C / Y = 12
PMT : END BEGIN

B [B] N = 24
I % = 5
PV = 0
PMT =
FV = 3000
P / Y = 12
C / Y = 12
PMT : END BEGIN

X [C] N = 24
I % = 5
PV = 0
PMT =
FV = 3000
P / Y = 2
C / Y = 2
PMT : END BEGIN

X [D] N = 2
I % = 5
PV = 0
PMT =
FV = 3000
P / Y = 12
C / Y = 12
PMT : END BEGIN

4. Sue wants to buy a new car that costs \$25 000. She is given a loan from the bank that has an interest rate of 8.5 % per year compounded monthly. Sue wants to have this loan paid off in 4 years. Find the amount of money she will have to pay at the end of each month.

A A [A] \$616.21 [B] \$611.87 [C] \$564.48 [D] \$512.91

5. The Simpsons bought a new house for \$149 700. Housing prices increased by 8 % each year for the next 5 years. The value of their house after 5 years, to the nearest dollar was... 149700(1.08)⁵

B [A] \$203 665 B [B] \$219 958 [C] \$237 555 [D] \$256559

6. Lisa invests \$6000 at 6 % compounded monthly. What will be the amount of her investment after 8 years?

- C [A] \$6244.24 [B] \$6370.07 [C] \$9684.86 [D] \$50960.53

$$6000(1 + \frac{0.06}{12})^{12 \times 8}$$

7. Mr. Burns invests \$800 at 12%/a compounded quarterly. How much interest gained after two years?

- B [A] \$192.00 [B] \$213.42 [C] \$892.00 [D] \$1013.42

$$800(1 + \frac{0.12}{4})^{4 \times 2} \quad I = 1013.42 - 800$$

$$1013.42$$

8. Marge borrowed \$1500 and was charged \$57.50 simple interest on her 8 month loan. What interest rate was she charged?

- B [A] 39.13% [B] 5.75% [C] 2.56% [D] 0.5%

$$r = \frac{57.50}{1500 \times \frac{8}{12}} \times 100\%$$

9. Malia invests \$2000 into a Canada Savings bond that pays 4.5 % simple interest. How much will the investment be worth after 10 years?

- C [A] \$900 [B] \$2105.93 [C] \$2900 [D] \$3105.93

$$2000 + 2000(0.045)(10)$$

10. Janna invested \$500 at 4% compounded annually. How long will it take for the \$500 investment to have a future value of approximately \$2000?

- B [A] 75 years [B] 36 years [C] 18 years [D] 9 years

$$500 \times 2 = 1000$$

$$1000 \times 2 = 2000$$

$$\frac{72}{4} = 18 \text{ years}$$

11. Lainey invested \$154 000 from a lottery win at 4%/a compounded weekly, how much money would she have in 9 months time?

- B [A] \$175 341.66 [B] \$158 688.17 [C] \$155 069.44 [D] \$154 355.20

$$154000(1 + \frac{0.04}{52})^{52 \times \frac{9}{12}}$$

12. How much money must be invested today at 7 % per year compounded semi-annually to have \$60 000 into a Guaranteed Investment Certificate (GIC) to pay for a child's education 18 years from now?

- B [A] \$5252.13 [B] \$17 389.96 [C] \$32 301.67 [D] \$207 015.97

$$\frac{60000}{(1 + \frac{0.07}{2})^{2 \times 18}}$$

13. Striper invested \$8500 from an inheritance at 4.5 % simple interest. If he leaves the investment for a term of 20 years, what would be his rate of return?

- A [A] 90 % [B] 111 % [C] 141 % [D] 241 %

$$I = 8500(0.045)(20) = 7650$$

$$PR = \frac{7650}{8500} \times 100$$

14. Carla has been saving for a car. She has \$3500 that she wants to invest, hoping she will end up with \$4000 to use as a down payment. Her bank has offered her a prime rate savings account that earns 5.25 % simple interest, paid annually. How long will it take Carla to reach her goal?

- D [A] 2 years [B] 2.5 years [C] 2.7 years [D] 3 years

$$t = \frac{500}{3500(0.0525)} = 2.7 \text{ years}$$

PART B – Open Response [26 Marks]

Answer each of the following in the space provided and put the answer in the blank. Be sure to give screenshots when using the TVM-Solver.

1. An investment portfolio contains the following...

- Monthly deposits of \$175 a month into a Tax Free Savings Account at 2.2 % compounded monthly.
- Deposit of \$7500 into a Canada Savings Bond at 4.2 % interest compounded quarterly.

a) What is the future value of this portfolio after 25 years? [5]

<p><u>TFSA</u></p> <p>N=300 I=2.2 PV=0 PMT=-175 FV=69909.04 PIY=12 CIY=12</p>	<p><u>CSB</u></p> <p>$A = 7500 \left(1 + \frac{0.042}{4}\right)^{4 \times 25}$ A=21315.38</p>	<p><u>TOTAL</u></p> <p>69909.04 + 21315.38 = 91224.42</p>
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Future Value = \$ 91224.42

b) What is the rate of return? [3]

<p>8</p> <p>Pay = 175(300) + 7500 = 60000</p>	<p>I = 91224.42 - 60000 ----- 31224.42</p>	<p>$\frac{31224.42}{60000} \times 100\%$ = 52%</p>
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Rate of Return = 52 %

2. Ms. Anita Nujob started making regular deposits \$125 per month into a Registered Retirement Savings Plan (RRSP) in 2018 for herself so she can use it when she retires in 2053. How much interest did his investment earn if the interest rate is 2.8 % compounded monthly? [5]

<p>5</p> <p>N=420 I=2.8 PV=0 PMT=-125 FV=89004.45 PIY=12 CIY=12</p>	<p>2053-2018 = 35 years</p> <p>Pay = 125(420) = 52500</p>	<p>I = 89004.45 - 52500 = 36504.45</p>
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Total amount invested = \$ 52500

Interest = \$ 36504.45

13

3. A Lund boat with motor retails for \$17 980 plus the HST of 15 % on the company website online. Bassmaster can afford monthly payments of \$425. He has two credit options...

- Use their financing plan, which charges 15.9 % interest compounded daily. As an incentive to using their credit plan, the store will pay the tax **and** provide a \$2000 immediate rebate.
- Use his line of credit from the bank, which charges 4.9 % interest compounded monthly.

Determine the amount that Bassmaster will need to pay for each option and **circle his BEST option**. [7]

<p><u>STORE</u></p> <p>$17980 - 2000$ $= 15980$</p> <p>$N = 52.54$ $I = 15.9$ $PV = 15980$ $PMT = -425$ $FV = 0$ $P/Y = 12$ $C/Y = 365$</p> <p>$Pay = 425(52.54)$ $= 22329.50$</p>	<p><u>LINE OF CREDIT</u></p> <p>$N = 54.35$ $I = 4.9$ $PV = 20677$ $PMT = -425$ $FV = 0$ $P/Y = 12$ $C/Y = 12$</p> <p>17980×1.15 $= 20677$</p> <p>$Pay = 425(54.35)$ $= 23098.75$</p>
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Store Credit Option = \$ 22329.50 Line of Credit Option = \$ 23098.75

4. Murdock works as handyman. He shoveled snow on 65 days last winter, so he wants a snowplow this year. He has three options...

- He could rent a snowplow for \$80 a day.
- He could buy a used snowplow for \$7200 and pay monthly payments with his line of credit at 5.1 % compounded monthly over 2 years.
- He could lease a snowplow with a down payment of \$2000 and monthly payments as \$225 for 2 years.

Showing calculations for each option, determine what option you would recommend and explain why. [6]

<p><u>RENT</u></p> <p>$80(65)(2)$ $= \\$10400$</p>	<p><u>LEASE</u></p> <p>$2000 + 225(24)$ $= 7400$</p>	<p><u>BUY</u></p> <p>$N = 24$ $I = 5.1$ $PV = 7200$ $PMT = -316.20$ $FV = 0$ $P/Y = 12$ $C/Y = 12$</p> <p>$Pay = 316.20(24)$ $= 7588.80$</p>
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Buy... you have an asset and can sell to get some money back