

# Port Shepstone Islamic School



## MATHEMATICS

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**GRADE 12**

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**Term 3 2020**

## FINANCIAL MATHS

## REVISION



**EDUCATOR: B GUNDANI**



B GUNDANI MAY 2020

## QUESTION 1 : FEB/MARCH 2017

- 1.1 On the 2<sup>nd</sup> day of January 2015 a company bought a new printer for R150 000.
- The value of the printer decreases by 20% annually on the reducing – balance method.
  - When the book value of the printer is R49 152, the company will replace the printer.
- 1.1.1 Calculate the book value of the printer on the 2<sup>nd</sup> day of January 2017 (3)
- 1.1.2 At the beginning of which year will the company have to replace the printer? Show ALL calculations. (4)
- 1.1.3 The cost of a similar printer will be R280 000 at the beginning of 2020. The company will use the R49 152 that it will receive from the sale of the old printer to cover some of the costs of replacing the printer. The company set up a sinking fund to cover the balance. The fund pays interest at 8,5% per annum, compounded quarterly. The first deposit was made on 2 April 2015 and every three months thereafter until 2 January 2020. Calculate the amount that should be deposited every three months to have enough money to replace the printer on 2 January 2020. (4)
- 1.2 Lerato wishes to apply for a home loan. The bank charges interest at 11% per annum, compounded monthly. She can afford a monthly instalment of R9 000 and wants to repay the loan over a period of 15 years. She will make the first monthly repayment one month after the loan is granted. Calculate, to the nearest thousand rand, the maximum amount that Lerato can borrow from the bank.

(5)

[16]

## QUESTION 2 : SEPTEMBER 2017

- 2.1 Samuel invested an amount with TRUST bank. His investment earned interest of 12% p.a. compounded monthly and grew to R8450 at the end of 10 years. Calculate the amount that Samuel initially invested. (3)
- 2.2 If the rate of depreciation remains at a constant of 4,7% p.a., calculate the period it will take for an amount to be worth half of what it was originally. The amount depreciates on a reducing – balance basis. (3)
- 2.3 Nokwe wants to buy a house. She takes out a loan for R950 000. Interest is charged on the loan at 10,5% p.a. compounded monthly.
- 2.3.1 Calculate the monthly repayments if the loan is repaid over 20 years. (5)
- 2.3.2 Calculate the balance on the loan at the end of 12 years. (5)
- [16]**

## QUESTION 3 : NOV 2017

- 3.1 Mbali invested R10 000 for 3 years at an interest rate of  $r$  % p.a., compounded monthly. At the end of this period, she received R12 146,72. Calculate  $r$ , correct to ONE decimal place. (5)
- 3.2 Piet takes a loan from a bank to buy a car for R235 000. He agrees to repay the loan over a period of 54 months. The first instalment will be paid one month after the loan is granted. The bank charges interest at 11% p.a., compounded monthly.
- 3.2.1 Calculate Piet's monthly instalment. (4)
- 3.2.2 Calculate the total amount of interest that Piet will pay during the first year of the repayment of the loan. (6)
- [15]**

**QUESTION 4 : MAY 2017**

4.1 A company bought a new machine for R500 000. After 3 years the machine has a book value of R331 527. Calculate the yearly rate of depreciation if the machine was depreciated according to the reducing – balance method. (3)

4.2 Musa takes a personal loan from a bank to buy a motorcycle that costs R46 000. The bank charges interest at 24% per annum, compounded monthly.

How many months will it take Musa to repay the loan, if the monthly instalment is R1 900? (4)

4.3 Neil set up an investment fund. Exactly 3 months later every 3 months thereafter he deposited R3 500 into the fund. The fund pays interest at 7,5% p.a., compounded quarterly. He continued to make quarterly deposits into the fund for 6 ½ years from the time that he originally set up the fund.

Neil made no further deposits into the fund, but left the money in the same fund at the same rate of interest. Calculate how much he will have in the fund 10 years after he originally set it up. (6)

**[13]**

**GRAND TOTAL**

**60**

**MEMO**

1.1.1	$A = 150\,000(1 - 0,2)^2$ $= R96\,000$	✓ $n = 2$ ✓ 150 000 in correct formula ✓ 96 000 (3)
1.1.2	$150\,000(1 - 0,2)^n = 49\,152$ $(0,8)^n = \frac{1024}{3125}$ $n \log(0,8) = \log \frac{1024}{3125}$ $n = 5$ <p>The machine will need to be replaced at the beginning of 2020 / <i>Masjien moet aan die begin van 2020 vervang word</i></p> <p><b>OR / OF</b></p> $150\,000(1 - 0,2)^n = 49\,152$ $(0,8)^n = \frac{1024}{3125}$ $n = \log_{0,8} \frac{1024}{3125}$ $n = 5$ <p>The machine will need to be replaced at the beginning of 2020 / <i>Masjien moet aan die begin van 2020 vervang word</i></p>	✓ $150\,000(1 - 0,2)^n = 49\,152$  ✓ $n \log(0,8) = \log \frac{1024}{3125}$ ✓ $n = 5$ ✓ 2020 (4)  ✓ $150\,000(1 - 0,2)^n = 49\,152$  ✓ $n = \log_{0,8} \frac{1024}{3125}$ ✓ $n = 5$ ✓ 2020 (4)
1.1.3	$R280\,000 - R49\,152$ $= R230\,848$ $230\,848 = \frac{x \left[ \left( 1 + \frac{0,085}{4} \right)^{20} - 1 \right]}{\frac{0,085}{4}}$ $x = R9\,383,26$	✓ R230 848 ✓ $i = \frac{0,085}{4} = 0,02125$ and $n = 20$ ✓ subs into correct formula ✓ R 9 383,26 (4)
1.2	$P_v = \frac{x[1 - (1 + i)^{-n}]}{i}$ $9\,000 \left[ 1 - \left( 1 + \frac{0,11}{12} \right)^{-180} \right]$ $= \frac{0,11}{12}$ $= R791\,837,43$ <p>Lerato qualifies for a loan of R 791 000 under the given conditions / <i>Lerato kwalifiseer vir 'n lening van R 791 000 gegewe die kondisies</i></p>	✓ $i = \frac{0,11}{12}$ ✓ $n = 180$ ✓ substitution correct formula  ✓ R791 837,43  ✓ R791 000 (5) [16]

## QUESTION 2

2.1		$A = P(1 + i)^n$ $8450 = P\left(1 + \frac{0,12}{12}\right)^{120}$ $P = R2560,31$	<p>A✓ formula A✓ correct substitution</p> <p>CA✓ answer</p>	(3)
2.2		$A = P(1 - i)^n$ $\frac{1}{2}P = P(1 - 0,047)^n$ $\frac{1}{2} = (1 - 0,047)^n$ $\log \frac{1}{2} = n \log(1 - 0,047)$ $n = 14,40 \text{ years}$	<p>A✓ subst.into correct formula</p> <p>M✓ use of logs CA✓ answer</p>	(3)
2.3	2.3.1	$P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $950000 = \frac{x\left[1 - \left(1 + \frac{0,105}{12}\right)^{-240}\right]}{\frac{0,105}{12}}$ $950000 = x(100,1622742)$ $\therefore x = R9484,61$	<p>A✓ <math>i</math> value (independent of the formula)</p> <p>A✓ substitution of P and <math>i</math> into correct formula</p> <p>A✓ <math>n</math> (independent of the formula)</p> <p>CA✓ simplification CA✓ answer</p>	(5)



3.2.2	<p>Outstanding balance after one year : A – F</p> $235\,000 \left(1 + \frac{11\%}{12}\right)^{12} - 5536,95 \left[ \frac{\left(1 + \frac{11\%}{12}\right)^{12} - 1}{\frac{11\%}{12}} \right]$ <p>= R192 296,17</p> <p><b>Capital Paid off = Loan – OB</b></p> <p>=R 235 000 - R192 296,17</p> <p>= R42 703,83</p> <p><b>Interest Paid = Total instalments ( 1 year) - Capital paid off</b></p> <p>= (R5536,95 × 12) - R 42 703,83</p> <p>= R23 739,57</p>	



**QUESTION 4:**

4.1	$A = P(1-i)^n$ $331527 = 500000(1-i)^3$ $(1-i)^3 = \frac{331527}{500000}$ $1-i = \sqrt[3]{\frac{331527}{500000}}$ $i = 0,12800\dots$ $= 12,8\%$	<p>✓ substitution of A, P &amp; n in correct formula</p> <p>✓ <math>1-i = \sqrt[3]{\frac{331527}{500000}}</math> or</p> <p><math>1-i = \sqrt[3]{0,663054}</math></p> <p>✓ answer</p> <p style="text-align: right;">(3)</p>
4.2	$P = \frac{x[1-(1+i)^{-n}]}{i}$ $46\ 000 = \frac{1900 \left[ 1 - \left( 1 + \frac{0,24}{12} \right)^{-n} \right]}{\frac{0,24}{12}}$ $\frac{46}{95} = 1 - \left( 1 + \frac{0,24}{12} \right)^{-n}$ $\left( 1 + \frac{0,24}{12} \right)^{-n} = \frac{49}{95}$ $n = -\log_{\left( 1 + \frac{0,24}{12} \right)} \frac{49}{95} \quad \text{OR/OF} \quad -n \log \left( 1 + \frac{0,24}{12} \right) = \log \frac{49}{95}$ $= 33,43276544\dots \text{ months}$ <p>It will take him 34 months to pay back the loan.</p>	<p>✓ <math>i = \frac{0,24}{12} / 0,02 / \frac{1}{50}</math></p> <p>✓ substitution of P , x and i in correct formula</p> <p>✓ 33,43</p> <p>✓ answer</p> <p style="text-align: right;">(4)</p>
4.3	$F = \frac{x[(1+i)^n - 1]}{i}$ $= \frac{3500 \left[ \left( 1 + \frac{0,075}{4} \right)^{4 \times 6,5} - 1 \right]}{\frac{0,075}{4}}$ $= R\ 115\ 902,69$ $A = P(1+i)^n$ $= 115\ 902,69 \left( 1 + \frac{0,075}{4} \right)^{4 \times 3,5}$ $= R\ 150\ 328,12$	<p>✓ <math>i = \frac{0,075}{4} / 0,01875</math></p> <p>✓ <math>n = 4 \times 6,5 = 26</math></p> <p>✓ substitution into correct formula</p> <p>✓ 115 902,69</p> <p>✓ substitution into correct formula</p> <p>✓ 150 328,12</p> <p style="text-align: right;">(6) [13]</p>