

QUESTION 6/VRAAG 6

6.1	$A = P(1+i)^n$ $13\,459 = 12\,000 \left(1 + \frac{m}{400}\right)^8$ $\left(1 + \frac{m}{400}\right)^8 = 1,121\dots$ $1 + \frac{m}{400} = \sqrt[8]{1,121\dots}$ $\frac{m}{400} = 0,0144\dots$ $\therefore m = 5,78\%$	<p>✓ 8 ✓ subst into correct formula</p> <p>✓ $1 + \frac{m}{400} = \sqrt[8]{1,121\dots}$</p> <p>✓ 5,78 %</p> <p style="text-align: right;">(4)</p>
6.2	$F = \frac{x[(1+i)^n - 1]}{i}$ $F = \frac{1\,000 \left[\left(1 + \frac{0,075}{12}\right)^{12} - 1 \right]}{\frac{0,075}{12}}$ $= R12\,421,22$ <p>He won't be able to buy the computer because $R13\,000 - R12\,421,22 = R578,78$ OR/OF He won't be able to buy the computer because $R12\,421,22 < R13\,000$</p>	<p>✓ $\frac{0,075}{12}$ ✓ 12</p> <p>✓ answer</p> <p>✓ conclusion</p> <p style="text-align: right;">(4)</p>
6.3.1	<p>Loan amount = $85\% \times R250\,000$ $= R212\,500$</p> <p>OR/OF Loan amount = $R250\,000 - (15\% \times R250\,000)$ $= R212\,500$</p>	<p>✓ answer (1)</p> <p>OR/OF</p> <p>✓ answer (1)</p>
6.3.2	$A = 212\,500 \left(1 + \frac{0,13}{12}\right)^5$ $A = 224\,262,53$ $P = \frac{x[1 - (1+i)^{-n}]}{i}$ $224\,262,53 = \frac{x \left[1 - \left(1 + \frac{0,13}{12}\right)^{-67} \right]}{\frac{0,13}{12}}$ $\therefore x = R4\,724,96$	<p>✓ $A = 212\,500 \left(1 + \frac{0,13}{12}\right)^5$ ✓ answer</p> <p>✓ substitution into correct formula ✓ - 67</p> <p>✓ answer (5)</p>
[14]		

QUESTION 7

7.1	$A = P(1+i)^n$ $2 = 1\left(1 + \frac{0,085}{4}\right)^{4n}$ $4n = \log_{\left(1 + \frac{0,085}{4}\right)} 2$ $n = 8,24 \text{ years}$	$\left. \begin{array}{l} \checkmark 2 \\ \checkmark \frac{0,085}{4} \end{array} \right\} \text{ In correct formula}$ \checkmark use of logs \checkmark answer in years (4)
7.2.1	$A = P(1-i)^n$ $180\,000 = 500\,000(1-i)^5$ $\frac{9}{25} = (1-i)^5$ $\sqrt[5]{\frac{9}{25}} = 1-i$ $i = 0,1848068\dots$ $r = 18,48\%$	\checkmark subs into correct formula \checkmark simplification $\checkmark i = 0,1848\dots$ \checkmark answer (4)
7.2.2	$A = P(1+i)^n$ $A = 500\,000(1 + 0,063)^5$ $A = R678\,635,11$	\checkmark subs into correct formula \checkmark answer (2)
7.2.3	$\text{Sinking Fund} = 678\,635,11 - 180\,000$ $= R\,498\,635,11$ $498\,635,11 = \frac{x \left[\left(1 + \frac{0,1025}{12}\right)^{58} - 1 \right] \left(1 + \frac{0,1025}{12}\right)^3}{\frac{0,1025}{12}}$ $x = R6\,510,36$	\checkmark value of sinking fund $\checkmark \frac{0,1025}{12}$ $\checkmark n = 58 \text{ (A)}$ $\checkmark \left(1 + \frac{0,1025}{12}\right)^3$ \checkmark answer (A) (5)
		[15]

QUESTION/VRAAG 8

8.1	$A = P(1 - i)^n$ $A = 980\,000(1 - 0,092)^7$ $A = R498\,685,82$	✓ correct formula ✓ substitution ✓ answer (A) (3)
8.2	$A = P(1 + i)^n$ $116\,253,50 = 75\,000 \left(1 + \frac{0,068}{4}\right)^{4n}$ $1,550\,046\,667 = (1,017)^{4n}$ $\log(1,550\,046\,667) = 4n \log(1,017)$ $4n = \frac{\log(1,550\,046\,667)}{\log(1,017)} \text{ or } 4n = \log_{1,017}(1,550\,046\,667)$ $4n = 25,99 \dots$ $n = 6,50 \text{ years}$	✓ $\frac{0,068}{4}$ ✓ substitution in correct formula ✓ correct use of logs ✓ answer (4)
8.3.1	$F = \frac{x[(1 + i)^n - 1]}{i}$ $450\,000 = \frac{x \left[\left(1 + \frac{0,0835}{12}\right)^{60} - 1 \right]}{\frac{0,0835}{12}}$ $x = R6\,068,69$	✓ $i = \frac{0,0835}{12}$ ✓ substitution into correct formula ✓ answer (3)
8.3.2(a)	$P = \frac{x[1 - (1 + i)^{-n}]}{i}$ $P = \frac{11\,058,85 \left[1 - \left(1 + \frac{0,12}{12}\right)^{-4 \times 12} \right]}{\frac{0,12}{12}}$ $P = R419\,948,32$ <p>OR/OF</p> $\text{Balance} = A - F$ $= P(1 + i)^n - \frac{x[(1 + i)^n - 1]}{i}$ $= 1\,050\,000 \left(1 + \frac{0,12}{12}\right)^{12 \times 21} - \frac{11\,058,85 \left[\left(1 + \frac{0,12}{12}\right)^{12 \times 21} - 1 \right]}{\frac{0,12}{12}}$ $= R12\,887\,702,20 - R12\,467\,749,81$ $= R419\,952,39$	✓ $n = 48$ in P-formula ✓ substitution into correct formula ✓ answer (A) (3) <p>OR/OF</p> ✓ $n = 252$ in both formulae ✓ subst into correct formulae ✓ answer (A) (3)

FINANCIAL MATHS MEMORANDUM

<p>8.3.2(b)</p>	<p>Total paid = $11\,058,85 \times 21 \times 12 = 2\,786\,830,20$ Loan Paid = $1\,050\,000 - 419\,948,32 = 630\,051,68$ Interest paid = $2\,786\,830,20 - 630\,051,68$ = R2 156 778,52</p> <p>OR/OF</p> <p>Total paid = $11\,058,85 \times 21 \times 12 = 2\,786\,830,20$ Loan Paid = $1\,050\,000 - 419\,952,39 = 630\,047,61$ Interest paid = $2\,786\,830,20 - 630\,047,61$ = R2 156 782,59</p> <p>OR/OF</p> <p>Interest paid = $11\,058,85 \times 21 \times 12 - (1\,050\,000 - 419\,948,32)$ = $2\,786\,830,20 - 630\,051,68$ = R2 156 778,52</p>	<p>✓ $11\,058,85 \times 21 \times 12$ ✓ $1\,050\,000 - \text{Balance Outstanding}$ ✓ answer (3)</p> <p>OR/OF</p> <p>✓ $11\,058,85 \times 21 \times 12$ ✓ $1\,050\,000 - \text{Balance Outstanding}$ ✓ answer (3)</p> <p>OR/OF</p> <p>✓ $11\,058,85 \times 21 \times 12$ ✓ $1\,050\,000 - \text{Balance Outstanding}$ ✓ answer (3)</p>
		<p>[16]</p>

QUESTION/VRAAG 7

7.1	$13\,080 = 10\,000 \left(1 + \frac{i}{4}\right)^{16}$ $\left(1 + \frac{i}{4}\right)^{16} = \frac{13\,080}{10\,000}$ $1 + \frac{i}{4} = \sqrt[16]{\frac{13\,080}{10\,000}}$ $\frac{i}{4} = 0,0169227\dots$ $i = 0,06769\dots$ $i = 6,77\%$	<p>✓ substitution into correct formula</p> <p>✓ $n = 16$</p> <p>✓ simplification</p> <p>✓ answer (A)</p> <p style="text-align: right;">(4)</p>
7.2.1	$F = \frac{x[(1+i)^n - 1]}{i}$ $F = \frac{9\,000 \left[\left(1 + \frac{0,075}{12}\right)^{60} - 1 \right]}{\frac{0,075}{12}}$ $F = R\,652\,743,95$	<p>✓ $\frac{0,075}{12}$</p> <p>✓ substitution into correct Formula</p> <p>✓ answer</p> <p style="text-align: right;">(3)</p>
7.2.2	$60 \times 9\,000 = R\,540\,000$ $A = P(1+i)^n$ $652\,743,95 \left(1 + \frac{0,075}{12}\right)^n = 190\,214,14 + 540\,000$ $730\,214,14 = 652\,743,95 \left(1 + \frac{0,075}{12}\right)^n$ $1,1186\dots = (1,00625)^n$ $n = \log_{1,00625}(1,1186)$ $\therefore n = 18 \text{ months}$	<p>✓ $60 \times 9\,000 = R\,540\,000$</p> <p>✓✓ equation</p> <p>✓ simplification</p> <p>✓ use of logs</p> <p>✓ 18 months</p> <p style="text-align: right;">(6)</p>

FINANCIAL MATHS MEMORANDUM

	<p>OR/OF</p> <p>Interest over 5 years = $652\,743,95 - 9\,000 \times 60$ $= 112\,743,95$</p> <p>\therefore interest on n years $= 190\,214,14 - 112\,743,95 = 77\,470,19$</p> <p>$652\,743,95 + 77\,470,19 = 652\,743,95 \left(1 + \frac{0,075}{12}\right)^n$</p> <p>$1,1186\dots = (1,00625)^n$ $n = \log_{1,00625} (1,1186)$ $\therefore n = 18$ months</p>	<p>OR/OF</p> <p>✓ $60 \times 9\,000$</p> <p>✓ answer</p> <p>✓ equating</p> <p>✓ simplification</p> <p>✓ use of logs</p> <p>✓ 18 months</p> <p style="text-align: right;">(6)</p>
		[13]