basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE 12/*GRAAD* 12

TECHNICAL MATHEMATICS P1/*TEGNIESE WISKUNDE V1*

NOVEMBER 2019

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKING CODES/*NASIENKODES*	
A	Accuracy/*Akkuraatheid*
AO	Answer only/*Slegs antwoord*
CA	Consistent accuracy/*Volgehoue akkuraatheid*
M	Method/*Metode*
R	Rounding/*Afronding*
NPR	No penalty for rounding/*Geen penalisering vir afronding nie*
NPU	No penalty for unit/*Geen penalisering vir eenhede weggelaat nie*
S	Simplification/*Vereenvoudiging*
F	Correct formula/*Korrekte formule*
SF	Substitution in correct formula/*Vervanging in korrekte formule*

MARKS/*PUNTE*: 150

These marking guidelines consist of 24 pages.
Hierdie nasienriglyne bestaan uit 24 bladsye.

Copyright reserved/*Kopiereg voorbehou*

NOTE:
¶ If a candidate answers a question TWICE, only mark the FIRST attempt.
¶ Consistent accuracy to be applied as indicated on the marking guidelines.
¶ # Shows questions where Tolerance Range will be applied are Q1.3, Q3.2, Q5.2 and Q5.3.

LET WEL:
¶ *Indien ôn kandidaat ôn vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.*
¶ *Volgehoue akkuraatheid sal toegepas word soos op die nasienriglyne aangedui .*
¶ *# Toon vrae waar Toleransie Wydte (Verdraagsaamheids omvang) toegepas word is V*1.3, V3.2, V5.2 en V5.3.

QUESTION/*VRAAG* 1

1.1.1	$p(x) = 2x^2 - \frac{8}{81}$ $= 2\left(x^2 - \frac{4}{81}\right)$ $= 2\left(x - \frac{2}{9}\right)\left(x + \frac{2}{9}\right)$ **OR/*OF*** $p(x) = \frac{162x^2 - 8}{81}$ $= \frac{2(81x^2 - 4)}{81}$ $= \frac{2(9x - 2)(9x + 2)}{81}$	V common factor/*gemene faktor* **A** V both factors/*beide faktore* **CA** **OR/*OF*** V common factor/*gemene faktor* **A** V both factors/*beide faktore* **CA** (2)	
1.1.2	$p(x) = 2\left(x - \frac{2}{9}\right)\left(x + \frac{2}{9}\right) = 0$ $\therefore x = \frac{2}{9}$ or/*of* $x = -\frac{2}{9}$ **OR/*OF*** $\therefore x = \pm\frac{2}{9}$ **OR / OF** $x \pm 0,22$ **OR/OF** $x = \frac{-(0) \pm \sqrt{(0)^2 - 4(2)\left(\frac{8}{81}\right)}}{2(2)}$ $\therefore x = \frac{2}{9}$ or/*of* $x = -\frac{2}{9}$ **OR/*OF*** $\therefore x = \pm\frac{2}{9}$ OR/OF $x \pm 0,22$	V both values of/*beide waardes van* x **CA** **OR/OF** V both values of/*beide waardes van* x **CA** (1)	

1.2.1	$(3x-5)(x+2)=-13$ $3x^2+x-10+13=0$ $3x^2+x+3=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-(1)\pm\sqrt{(1)^2-4(3)(3)}}{2(3)}$ $x=\frac{-1\pm\sqrt{-35}}{6}$ $x=\frac{-1\pm\sqrt{35}\,i}{6}$ **OR/*OF*** $x\pm\frac{-1\pm5{,}92i}{6}$ **OR/*OF*** $x=-\frac{1}{6}+\frac{\sqrt{35}}{6}i$ or/*of* $-\frac{1}{6}-\frac{\sqrt{35}}{6}i$ **OR/*OF*** $x\pm-0{,}17+0{,}99i$ or/*of* $x\pm-0{,}17-0{,}99i$ **OR/*OF*** $x=-\frac{1}{6}\pm\frac{\sqrt{35}}{6}i$ **OR/*OF*** $x\pm-0{,}17\pm0{,}99i$	V standard form/*standaard vorm* **A** V **SF** **CA** V **S** **CA** V $\sqrt{-35}=\sqrt{35}\,i$ **CA** V both *x*-values/*beide x-waardes* **CA** (5)	
1.2.2	$(4-x)(x+3)<0$ **OR/*OF*** $(x-4)(x+3)>0$ CV: $x=-3$ and $x=4$ $x<-3$ or/*of* $x>4$ **OR/*OF*** $x\in(-\infty;-3)\cup(4;\infty)$	V both critical values/*beide kritiese waardes* **A** VV correct notation for each interval/*korrekte notasie vir elke interval* **CA** Accept Number Line/*Aanvaar getallelyn* (3)	

1.3	$y = 3x - 8$ $x^2 - xy + y^2 = 39$ $x^2 - x(3x - 8) + (3x - 8)^2 = 39$ $x^2 - 3x^2 + 8x + 9x^2 - 48x + 64 - 39 = 0$ $7x^2 - 40x + 25 = 0$ $(x - 5)(7x - 5) = 0$ **OR/*OF*** $x = \frac{-(-40) \pm \sqrt{(40)^2 - 4(7)(25)}}{2(7)}$ $\therefore \quad x = 5$ or/*of* $x = \frac{5}{7}$ **OR / OF** 0,71 $y = 3(5) - 8 = 7$ or/*of* $y = 3\left(\frac{5}{7}\right) - 8 = -\frac{41}{7}$ **OR / *OF*** $y \approx -5,86$ **OR/*OF*** $y = 3x - 8$ $x^2 - xy + y^2 = 39$ $x = \frac{y+8}{3}$ $x^2 - xy + y^2 = 39$ $\left(\frac{y+8}{3}\right)^2 - y\left(\frac{y+8}{3}\right) + y^2 = 39$ $\frac{y^2 + 16y + 64}{9} - \frac{y^2}{3} - \frac{8y}{3} + y^2 = 39$ $y^2 + 16y + 64 - 3y^2 - 24y + 9y^2 = 351$ $7y^2 - 8y - 287 = 0$ $(y - 7)(7y + 41) = 0$ **OR/*OF*** $x = \frac{-(-40) \pm \sqrt{(40)^2 - 4(7)(25)}}{2(7)}$ $\therefore \quad y = 7$ or/*of* $y = -\frac{41}{7}$ **OR / *OF*** $y \approx -5,86$ $x = \frac{7+8}{3} = 5$ or/*of* $x = \frac{-\frac{41}{7}+8}{3} = \frac{5}{7}$ **OR / *OF*** $x \approx 0,71$	√ substitution/*vervanging* **A** √ **S** **CA** √ standard form/*standaard vorm* **CA** √ factors or formula/*faktore* **CA** √both *x*-values/*beide x-waardes* **CA** √both *y*-values/*beide y-waardes* **CA** **OR/*OF*** √ substitution/*vervanging* **A** √ **S** **CA** √ standard form/*standaard vorm* **CA** √ factors/ formula/*faktore* **CA** √ both *y*-values/*beide y-waardes* **CA** √both *x*-values/*beide x-waardes* **CA** (6)	

1.4.1	$V = I^3 Z$ $I = \frac{V}{Z}$ **OR/*OF*** $I = VZ^{-1}$	V dividing by/*deel deur* Z **A** (1)	
1.4.2	$I = \frac{V}{Z}$ $= \frac{7i}{3 - i}$ $= \frac{7i}{3 - i} \cdot \frac{3 + i}{3 + i}$ $= \frac{21i + 7i^2}{9 - i^2}$ $= \frac{21i + 7(-1)}{9 - (-1)}$ $= \frac{-7 + 21i}{10}$ **OR/*OF*** ï $0{,}7 + 2{,}1i$ **OR/*OF*** $\frac{-7}{10} + \frac{21i}{10}$	V substitution/*vervanging* **CA** V **M** multiply by/ *vermenigvuldig met* $\frac{3 + i}{3 + i}$ **A** V**S** **CA** V value of/*waarde van* i^2 **A** V value of current/*waarde van. stroom* **CA** **NPU** (5)	
1.5	$\begin{array}{rrrr} & 1 & 0 & 1_2 \\ \times & & 1 & 1_2 \\ \hline & 1 & 0 & 1_2 \\ + & 1 & 0 & 1 \quad 0_2 \\ \hline 1 & 1 & 1 & 1_2 \end{array}$ **OR/*OF*** $101_2 \cdot 11_2 = 5 \cdot 3 = 15$ **OR / *OF*** 1111_2	V **M** **A** V 1111_2 **A** **OR/*OF*** V both/*beide* 5 and/*en* 3 **A** V 1111_2 **OR/*OF*** 15 **A** [redacted] (2) **[25]**	

QUESTION/*VRAAG* 2

2.1.1	$G = \sqrt{\frac{p+1}{2p-1}}$ $2p-1=0$ $\therefore p=\frac{1}{2}$	 V $p=\frac{1}{2}$ **A** (1)	
2.1.2	$p+1=0$ $p=-1$	 V $p=-1$ **A** (1)	
2.2	$x^2-k+4=5x$ $x^2-5x-k+4=0$ $b^2-4ac \geq 0$ $(-5)^2-4(1)(-k+4) \geq 0$ $25+4k-16 \geq 0$ $4k+9 \geq 0$ $k \geq -\frac{9}{4}$	 V standard form/ *standard vorm* **A** V the discriminant/*die diskriminant* ≥ 0 **A** V **SF** **A** V **S** **CA** V values of/*waardes van k* **CA** (5) **[7]**	

QUESTION/*VRAAG* 3

3.1	$\left(-2\sqrt[4]{a^3}\right)^8$ $=(-2)^8\left(a^3\right)^{\frac{8}{4}}$ $=256a^6$	V 256 **A** V a^6 **A** (2)	
3.2 #	$\log_2(3x-2)+\log_2 0,5=3$ $\log_2(3x-2)+\log_2 2^{-1}=3$ $\log_2(3x-2)-1=3$ $\log_2(3x-2)=4$ $(3x-2)=2^4$ $3x-2=16$ $x=6$ **OR/*OF*** $\log_2(3x-2)+\log_2 0,5=3$ $\log_2(0,5)(3x-2)=3$ $(0,5)(3x-2)=2^3$ $(0,5)(3x-2)=8$ $3x-2=16$ $x=6$ **OR/*OF*** $\log_2(3x-2)+\log_2 0,5=3$ $\log_2(3x-2)=3-\log_2 0,5$ $\log_2(3x-2)=3\log_2 2-\log_2 0,5$ $\log_2(3x-2)=\log_2 8-\log_2 0,5$ $\log_2(3x-2)=\log_2\left(\frac{8}{0,5}\right)$ $3x-2=16$ $x=6$ **OR/*OF***	V $\log_2 0,5=-1$ **A** V **S** **CA** V exponential form/*eksponent vorm* **CA** Vcorrect value/*korrekte waarde* **CA** **OR/*OF*** Vlog property/*eienskap* **A** Vexponential form/*eksponent vorm* **A** V **S** **CA** Vcorrect value/*korrekte waarde* **CA** **OR/*OF*** Vlog property/*eienskap* **A** V log property/*eienskap* **A** V **S** **CA** Vcorrect value/*korrekte waarde* **CA**	

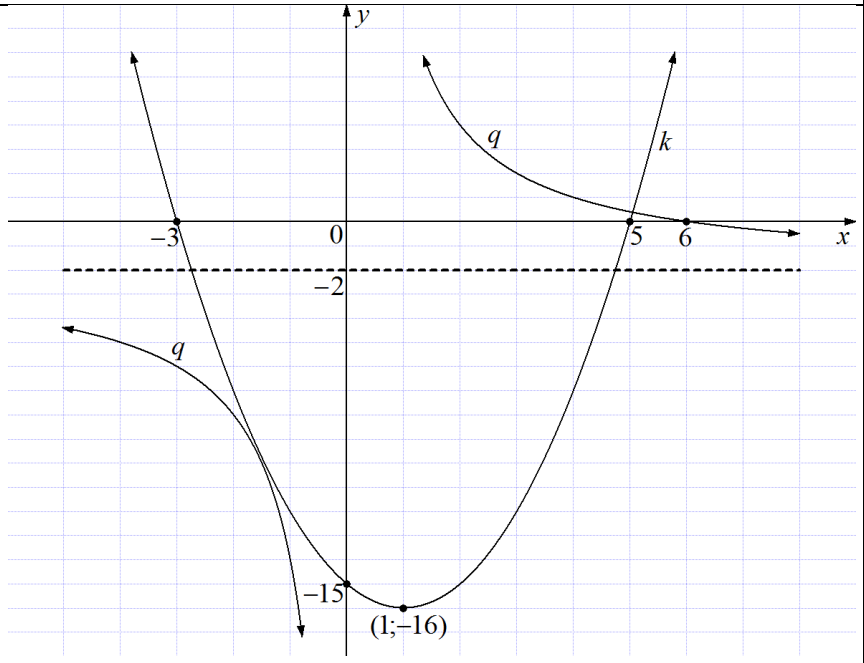
	$\log_2 0,5(3x - 2) = \log_2 2^3$ $\log_2 0,5(3x - 2) = \log_2 8$ $0,5(3x - 2) = 8$ $3x - 2 = 16$ $x = 6$ **OR/*OF*** $\log_2(3x - 2) + \log_2 0,5 = 3$ $\log_2(3x - 2) - \log_2 2 = 3$ $\log_2 \frac{(3x - 2)}{2} = 3$ $\frac{(3x - 2)}{2} = 2^3$ $3x - 2 = 16$ $x = 6$	**OR/*OF*** V log property/*eienskap* **A** V log property/*eienskap* **A** V **S** **CA** V correct value/*korrekte waarde* **CA** **OR/*OF*** V log property/*eienskap* **A** V log property/*eienskap* **A** V **S** **CA** V correct value/*korrekte waarde* **CA** (4)	

3.3	$\log\sqrt{0,6}$ $=\log(0,6)^{\frac{1}{2}}$ **OR / *OF*** $\log(0,3^{3}2)^{\frac{1}{2}}$ **OR / *OF*** $\log(0,2^{3}3)^{\frac{1}{2}}$ $=\frac{1}{2}\log\left(\frac{6}{10}\right)$ **OR / *OF*** $\frac{1}{2}\log(0,3^{3}2)$ **OR / *OF*** $\frac{1}{2}\log(0,2^{3}3)$ $=\frac{1}{2}\log\left(\frac{3^{3}2}{10}\right)$ $=\frac{1}{2}(\log 3+\log 2-\log 10)$ $=\frac{1}{2}(b+a-1)$ **OR/*OF*** $\frac{1}{2}b+\frac{1}{2}a-\frac{1}{2}$ **OR/*OF*** $\log\sqrt{0,6}=\log\sqrt{\frac{3}{5}}$ $=\frac{1}{2}\log 3-\frac{1}{2}\log 5$ $\therefore \log\sqrt{0,6}=\frac{1}{2}\log 3+\frac{1}{2}(\log 2-\log 10)$ $=\frac{1}{2}(b+a-1)$ **OR/*OF*** $\frac{1}{2}b+\frac{1}{2}a-\frac{1}{2}$	√ exp. form/*eksp. vorm* **A** √ conversion of / *herleiding van* 0,6 **A** √ log property/*eienskap* **A** √ $\log 10=1$ **CA** √ substitution/*vervanging* **CA** **OR/*OF*** √ conversion of / *herleiding van* 0,6 **A** √ log property/*eienskap* **A** √ conversion of log 5 **A** √ $\log 10=1$ **CA** √ substitution/*vervanging* **CA** (5)	
3.4.1	$V=2(\cos 240^{\circ}+i\sin 240^{\circ})$ **OR/*OF*** $V=2(\cos\frac{3}{4}\pi+i\sin\frac{3}{4}\pi)$	√ value of/ *waarde van* V **A** (1)	

3.4.2	$V = 2\left(\cos 240^{-} + i\sin 240^{-}\right)$ **OR/*OF***	**CA from/*vanaf* Q/V3.4.1**	
	$V = 2\left(\cos\frac{3}{4}p + i\sin\frac{3}{4}p\right)$	V value of/*waarde van* $\cos 240^{-}$ OR/*OF* $\cos\frac{3}{4}p$ **CA**	
	$V = 2\left(\frac{1}{2} - \frac{\sqrt{3}}{2}i\right)$	V value of/*waarde van* $\sin 240^{-}$ OR/*OF* $\sin\frac{3}{4}p$ **CA**	
	$\therefore V = -1 - \sqrt{3}i$	V V in rect. form/ *in regh.vorm* **CA**	
	OR/*OF*	**OR/*OF***	
	$q = 60^{-}$ [ref angle/ *verw. hoek*]	V ref. angle/*verw. hoek* **A**	
	$\tan 60^{-} = \sqrt{3} = \frac{-\sqrt{3}}{-1}$	V tan ratio/verhouding **A**	
	$V = -1 - \sqrt{3}\,i$	V V in rect form/ *in regh.vorm* **CA**	
		AO: Full marks/*Volpunte*	
		(3)	
3.5	$m + ni = 2(6 - 4i) - (-7i)$		
	$= 12 - 8i + 7i = 12 - i$		
	$m = 12$ and/ *en* $n = -1$	V value of *m*/ *waarde van m* **A** V value of *n*/ *waarde van n* **A**	
	OR/OF	**OR/OF**	
	$m = 2(6) = 12$ and/ *en* $n = 2(-4) - (-7) = -1$	V value of *m*/ *Waarde van m* **A** V value of *n*/ *Waarde van n* **A**	
		(2)	
		[17]	

QUESTION/*VRAAG* 4

4.1.1	$(x-5)(x+3)=0$ $x=5$ or/*of* $x=-3$ **OR/OF** $(5;0)$ and / *en* $(-3;0)$	V both values of/ *beide waardes van x* **A** (1)	
4.1.2	$q(x)=\frac{12}{x}-2$ $\frac{12}{x}-2=0$ $2x=12$ $x=6$ **OR / *OF*** $(6;0)$ **OR/*OF*** $q(x)=\frac{a}{x}+p$ $x=\frac{a}{-p}$ $[q(x)=0]$ $=\frac{12}{-(-2)}$ $=6$ **OR / *OF*** $(6;0)$	V $y=0$ **A** V x-value/*waarde* **CA** **OR/*OF*** V $y=0$ **A** V x-value/*waarde* **CA** (2) **AO**: Full marks /*Volpunte*	

4.1.3	$x = \frac{5-3}{2} = 1$ $k(1) = (1-5)(1+3) = -16$ \ TP/*DP* $(1;-16)$ **OR / *OF*** $(x-5)(x+3) = 0$ $x^2 - 2x - 15 = 0$ $x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = 1$ $k(1) = (1)^2 - 2(1) - 15 = -16$ **OR / *OF*** $y = \frac{4ac-b^2}{4a} = \frac{4(1)(-15)-(-2)^2}{4(1)} = -16$ \ TP/*DP* $(1;-16)$ **OR/*OF*** $k'(x) = 2x - 2$ $2x - 2 = 0$ \ $x = 1$ $k(1) = (1)^2 - 2(1) - 15 = -16$ \ TP/*DP* $(1;-16)$	V **M** **CA** V $x = 1$ **A** V $y = -16$ **CA** **OR/*OF*** V **M** **CA** V $x = 1$ **A** V $y = -16$ **A** **OR/*OF*** V **M** **A** V $x = 1$ **A** V $y = -16$ **CA** (3)	
4.1.4	$y = -2$ $x = 0$	V $y = -2$ **A** V $x = 0$ **A** (2)	
4.1.5		<u>*Graph / grafiek k*:</u> V*x*-intercepts/*afsnitte* **CA** V*y*-intercept/*afsnitte* **CA** Vshape/*vorm* **A** Vturning point/ *draaipunt* **CA** <u>*Graph / grafiek q*:</u> V hor. asympt/*asimpt* **A** V *x*-intercepts/*afsnit* **CA** V shape/*vorm* **A** (7)	

4.2.1	$d = -4$	V value of/*waarde van d* **A** Accept/ Aanvaar $y = -4$ (1)	
4.2.2	$h(x) = a^x - 4$ $-2 = a^{-1} - 4$ $a = \frac{1}{2}$ $\therefore h(x) = \left(\frac{1}{2}\right)^x - 4$	V substitution/*vervanging* **CA** V correct value of/ *korrekte waarde van a* **CA** (2)	
4.2.3	$h(0) = a^0 - 4$ **OR / OF** $h(0) = (0,5)^0 - 4$ $T(0 ; -3)$	V $x = 0$ **A** V $y = -3$ **CA** (2)	
4.2.4	$y \in [-3 ; 0]$ **OR/*OF*** $-3 \leq y \leq 0$	V range/ *waardeversm(terrein)* **CA** (1)	
4.2.5	$p(x) = -\sqrt{9 - x^2}$ $\therefore w(x) = \sqrt{9 - x^2}$ **OR/OF** $\therefore w(x) = \sqrt{r^2 - x^2}$	V equation of/ *vergelyking van p* **CA** V equation of/ *vergelyking van w* **CA** (2) [redacted]	
4.2.6	$0 < x \leq 3$ **OR/*OF*** $x \in (0 ; 3]$	V endpoints/*eindpunte* **A** V correct notation/ *korrekte notasie* **A** (2) **[25]**	

QUESTION/*VRAAG* 5

5.1.1	R11 000	✓ new value/ *nuwe waarde* **A** (1)	
5.1.2	$A = R5\,500 \quad P = R11\,000 \quad n = 5 \quad i = ?$ $A = P(1 - in)$ $R5\,500 = R11\,000(1 - i \times (5))$ $i = \dfrac{\dfrac{R5\,500}{R11\,000} - 1}{-5}$ $= 0{,}10$ $= 10\%$	✓SF **CA** ✓making *i* the subject/ *maak i die onderwerp* **CA** ✓ interest rate/ *rentekoers* **CA** **AO: Full marks/*Volpunte*** (3)	
5.2 #	$A = P(1 + i)^n$ $273 = 200(1 + 3{,}5\%)^n$ $\dfrac{273}{200} = (1{,}035)^n$ $n = \dfrac{\log \frac{273}{200}}{\log(1{,}035)}$ **OR / *OF*** $n = \log_{1{,}035} \dfrac{273}{200}$ $\approx 9{,}04$ years/ *jaar* ∴ the year 2018 / *die jaar* 2018 **OR/*OF*** $A_1 = R200\,(1 + 3{,}5\%)^1 \approx R207$ $A_2 = R200\,(1 + 3{,}5\%)^2 \approx R214{,}25$ . . $A_9 = R200\,(1 + 3{,}5\%)^9 \approx R272{,}58$ $A_{10} = R200\,(1 + 3{,}5\%)^{10} \approx R282{,}12$ ∴ the year 2018 / *die jaar 2018*	✓SF **A** ✓S **CA** ✓ log property/ *eienskap* **CA** ✓value of/waarde van *n* **CA** ✓ correct year/ *korrekte jaar* **CA** **OR/*OF*** ✓SF **A** ✓S **CA** ✓SF **A** ✓S **CA** ✓ correct year/ *korrekte jaar* **CA** **NOTE/ *NOTA*: Accept/*Aanvaar* 2019** **NPR** (5)	

5.3 #	Value of the investment after initial deposit/ *waarde van die belegging na die aanvangs deposito*: $A = P(1+i)^n$ $= R293\,000\left(1+\frac{6,7\%}{4}\right)^{2\times 4}$ $\approx R\,334\,642,4791$ $R334\,642,4791 + R95\,000 = R429\,642,4791$ Value of the investment after adding/*waarde van die belegging na byvoeging van* R95 000 : $= 429\,642,4791\left(1+\frac{6,7\%}{4}\right)^{2\times 4}$ $\approx R490\,705,2026$ Value of the investment after change in interest rate/*waarde van die belegging na verandering van rentekoers :* $= R490\,705,2026\left(1+\frac{7,5\%}{12}\right)^{4\times 12}$ $\approx R661\,764,62 > R660\,580$ \ Yes she has accumulated sufficient funds./*Ja, sy het genoeg fondse geakkumuleer* **OR/*OF*** $A = \left[293\,000\left(1+\frac{6,7\%}{4}\right)^{2\times 4} + 95\,000\right]\left(1+\frac{6,7\%}{4}\right)^{2\times 4}\left(1+\frac{7,5\%}{12}\right)^{4\times 12}$ $\approx R\,661\,764\,,62 > R\,660\,580$ \ Yes she has accumulated sufficient funds./ *Ja, sy het genoeg fondse geakkumuleer* **OR/*OF***	V**SF** **A** V **S** **CA** V **S** **CA** V**SF** **A** V **S** **CA** V value of *i* and *n*/ *waarde van i en n* **A** V **S** **CA** V conclusion/ *gevolgtrekking* **CA** **OR/*OF*** V **M** **A** VV**SF** **A** V value of *i* and *n*/ *waarde van i en n* **A** Vadding/*byvoeging* R95 000 **A** Vchange of rate/ *verandering van koers* **A** V**S** **CA** V conclusion/ *gevolgtrekking* **CA** **OR/*OF***	

$$A = R293\,000\left(1+\frac{6,7\%}{4}\right)^{4\times 4}\cdot\left(1+\frac{7,5\%}{12}\right)^{4\times 12}$$
$$+R95\,000\left(1+\frac{6,7\%}{4}\right)^{2\times 4}\left(1+\frac{7,5\%}{12}\right)^{4\times 12}$$

V **M** **A**
VV**SF** **A**
V value of *i* and *n*/ *waarde van i en n* **A**
Vadding/*byvoeging* R95 000 with interests/*met rente* **A**

o R 661 764 , 62 > R 660 580
\ Yes she has accumulated sufficient funds./
Ja, sy het genoeg fondse geakkumuleer

Vchange of rate/ *verandering van koers* **A**
V**S** **CA**
V conclusion/ *gevolgtrekking* **CA**

OR/OF

$$P = R660\,580\left(1+\frac{6,7\%}{4}\right)^{-4\times 2}\cdot\left(1+\frac{7,5\%}{12}\right)^{-4\times 12}$$
$$- R95\,000\left(1+\frac{6,7\%}{4}\right)^{2\times 4}\left(1+\frac{7,5\%}{12}\right)^{4\times 12}$$

OR/*OF*

V **M** **A**
VV**SF** **A**
V value of *i* and *n*/ *waarde van i en n* **A**
Vsubtracting R95 000 with interests **A**

o R 282 547 , 91 < R 293 000
Yes she has accumulated sufficient funds./
Ja, sy het genoeg fondse geakkumuleer

Vchange of rate/ *verandering van koers* **A**
V**S** **CA**
V conclusion/ *gevolgtrekking* **CA**

OR/*OF*

$$1+i_{eff}=\left(1+\frac{i_{nom}}{m}\right)^{m}=\left(1+\frac{6,7\%}{4}\right)^{4}\ o\ 0,068...$$

OR/OF

2 years/ *jaar*:

$$A = P(1+i)^n = R293\,000(1+0,068...)^2 + R95\,000$$
$$o\ R\,429\,642,48$$

VSF **A**
V S **CA**

4th year/ *jaar*:

$$A = R429\,642,48\,(1+0,068...)^2\ o\ R490\,705,20$$

V SF **CA**
V**S** **CA**

5 ï 8 years/ *jaar*:

$$A = R490\,705,20\left(1+\frac{7,5\%}{12}\right)^{4\times 12}\ o\ \ R661\,764,62 > R660580$$

V S **CA**

\ Yes she has accumulated sufficient funds./
Ja, sy het genoeg fondse geakkumuleer

OR/OF

V value of *i* and *n*/ *waarde van i en n* **A**
V S **CA**

$A = P(1+i)^n$

$A_0 = R293\,000\left(1+\frac{0,067}{4}\right)^{4\times 4}$

$= R\,382\,203,3749$ V SF A

$A_1 = R382\,203,3749\left(1+\frac{0,075}{12}\right)^{4\times 12}$ V S CA

$= R\,515\,439,147$ V SF A

$A_2 = R95\,000\left(1+\frac{0,067}{4}\right)^{2\times 4}$ V S CA

$= R\,108\,501,8277$

$A_3 = R108\,501,8277\left(1+\frac{0,075}{12}\right)^{4\times 12}$ V S CA

$= R\,146\,325,4728$

V value of *i* and *n*/ *waarde van i en n* A

$A_1 + A_3 = R661\,764,62 > R660\,580$

\ Yes she has accumulated sufficient funds./
Ja, sy het genoeg fondse geakkumuleer

V conclusion/ *gevolgtrekking* CA
OR/OF

V S CA

NOTE/*NOTA*:
1) Max. 4 marks if Simple Interest is used./
Maks 4 punte indien enkelvoudige rente
2) Max. 2 marks if any Depreciation is used./
Maks 2 punte indien enkelvoudige rente

(8)
[17]

QUESTION/*VRAAG* 6

6.1	$f(x)=5-\frac{1}{2}x$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $=\lim_{h\to 0}\frac{\left(5-\frac{1}{2}(x+h)\right)-\left(5-\frac{1}{2}x\right)}{h}$ $=\lim_{h\to 0}\frac{5-\frac{1}{2}x-\frac{1}{2}h-5+\frac{1}{2}x}{h}$ $=\lim_{h\to 0}\frac{-\frac{1}{2}h}{h}$ $=\lim_{h\to 0}\left(-\frac{1}{2}\right)$ $\therefore f'(x)=-\frac{1}{2}$	✓definition/*definisie* **A** ✓ **SF** **A** ✓ **S** **CA** ✓ $\lim_{h\to 0}\frac{-\frac{1}{2}h}{h}$ **CA** ✓ $-\frac{1}{2}$ **CA** **AO: ONLY 1 mark/ SLEGS 1 *punt*** **Penalty of 1 mark for incorrect notation/ *penaliseer 1 punte vir verkeerde notasie*** (5)	
No penalty for notation in the remaining questions/ *Geen penaliseering vir notasie in die*			
6.2.1	$f(x)=a^3-0,5x^3-x^{-1}$ $f'(x)=0-1,5x^2+x^{-2}$ **OR / *OF*** $-1,5x^2+x^{-2}$	✓ derivative of/ *afgeleide van* a^3 **A** ✓ $-1,5x^2$ **A** ✓ x^{-2} **A** (3)	
6.2.2	$D_x\left[x\left(\sqrt{x}+2\right)\right]$ $=D_x\left[x\left(x^{\frac{1}{2}}+2\right)\right]$ $=D_x\left[x^{\frac{3}{2}}+2x\right]$ $=\frac{3}{2}x^{\frac{1}{2}}+2$	✓ $x^{\frac{1}{2}}$ **A** ✓ product/*produk* **CA** ✓ $\frac{3}{2}x^{\frac{1}{2}}$ **CA** ✓ 2 **CA** (4)	

6.3.1	$xy + 2x^3 = 7x^6$ $y = \frac{7x^6 - 2x^3}{x}$ **OR / OF** $y = 7x^5 - 2x^2$	V **M** **A** V making *y* the subject/*maak y die onderwerp* **A** (2)	
6.3.2	$y = 7x^5 - 2x^2$ $\frac{dy}{dx} = 35x^4 - 4x$	V $35x^4$ **CA** V $-4x$ **CA** (2)	
6.4.1	$P(300) = 0,8(300)^2 - 200(300)$ $= R12\,000$	Vprofit/*wins* **A** (1)	
6.4.2	$P(x) = 0,8x^2 - 200x$ $0,8x^2 - 200x = 0$ $x(0,8x - 200) = 0$ OED OGB 90q proved/bewys ?ODE OBG 3rd/de **OR/OF** ?DOE BOG ?ODE OBG 3rd/de	V factors/*faktore* **M** **A** Vcorrect value of/*korrekte waarde van x* **CA** **OR/OF** V isolating/ *isoleer x* **M** **A** Vcorrect value of/*korrekte waarde van x* **CA** [redacted] (2)	
6.4.3	$\frac{OE}{OG}$ $\frac{3,6}{6}$ $\frac{3}{5}$	Vderivative/*afgeleide* **A** V substitution/*vervanging* **CA** Vrate/*tempo* **CA** **NPU** (3) **[22]**	