Education and Sport Development
Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

GRADE / GRAAD 11

TECHNICAL MATHEMATICS P1
TEGNIESE WISKUNDE V1
MEMORUNDUM
MID YEAR EXAMINATION 2018
HALFJAAR EKSAMEN 2018

MARKS / PUNTE: 100
TIME / TYD: 2 hours / ure

This memorandum consist of 9 pages
Hierdie memorandum bestaan uit 9 bladsye

QUESTION 1

1.1	$x(x-4)=-4$ $x^2-4x+4=0$ $(x-2)(x-2)=0$ $x=2 \quad or \quad x=2$	3	✓standard form ✓ factors/faktor ✓ $x=2$
1.2	$2x^2-3x-4=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-3\pm\sqrt{9+32}}{4}$ $x=\frac{-3\pm\sqrt{41}}{4}$ $x=2{,}35$ or $x=-0{,}85$ or $x=0$	5	✓Corr Formula Regte formule ✓Substitution Vervanging ✓ $x=\frac{3\pm\sqrt{41}}{4}$ ✓ $x=2{,}35$ ✓ $x=0{,}85$
1.3	$3x^{\frac{2}{3}}-7x^{\frac{1}{3}}+2=0$ $(3x^{\frac{1}{3}}-1)(x^{\frac{1}{3}}-2)=0 \setminus$ $3x^{\frac{1}{3}}=1 \quad$ or $\quad x^{\frac{1}{3}}=2$ $x^{\frac{1}{3}}=\frac{1}{3}$ or $x=2^3$ $x=\frac{1}{27}$ or $x=8$	4	✓Factors/Faktore ✓ $x^{\frac{1}{3}}=\frac{1}{3}$ and $x^{\frac{1}{3}}=2$ ✓Remove exponent/Verwyder eksponent ✓Both Answers/Beide antwoorde

1.4	$\frac{1}{x+1}+\frac{2x}{x-1}=1$ $(x+1)(x-1)\left[\frac{1}{x+1}+\frac{2x}{x-1}=1\right]$ $1(x-1)(x+1)+2x(x+1)=x^2-1$ $x-1+2x(x+1)=x^2-1$ $x^2+3x=0$ $x(x+3)=0$ $x=0 \quad or \quad x=-3$	5	✓ LCD/KGV ✓Remove brackets Verwyder hakies ✓Standard form Standaardvorm ✓Factors/Faktore ✓Both Answers Beide Antwoorde
		[17]	

QUESTION 2

2.1	$x+13x+36<0$ $(x+4)(x+9)<0$ $-9<x<-4$	3	✓Factors Faktore ✓ Notation/Skryfwyse ✓End points Eindpunte
2.2	$x=2-3y$ $y+2-3y=y(2-3y)+y$ $y+2-3y=2y-3y^2+y$ $4y^2-6y+2=0$ $2y^2-3y+1=0$ $(2y-1)(y-1)=0$ $2y=1 \quad or \quad y=1$ $y=\frac{1}{2} \quad or \quad y=1$ $x=2-3\left(\frac{1}{2}\right) \quad or \quad x=2-3(1)$ $x=\frac{1}{2} \quad or \quad x=-1$	7	✓ $x=2-3y$ ✓Substitution Vervanging ✓Standard form Stanaardvorm ✓Factors Faktore ✓ $y=\frac{1}{2}$ ✓ $y=1$ ✓Both x values Beide x-waardes
2.3	$p^2=q^2+r^2-2qr\cos\hat{P}$ $p^2-q^2-r^2=-2qr\cos p$ $\cos P=\frac{p^2-q^2-r^2}{-2qr}$	3	✓ $p^2-q^2-r^2$ ✓ Numerator Teller ✓ Denominator Noemer
		[13]	

QUESTION 3

3.1.1	$x^2 + x + t = 0$ $x = \frac{-b \pm \sqrt{b-4ac}}{2a}$ $x = \frac{-1 \pm \sqrt{1-4(1)(t)}}{2(1)}$ $x = \frac{-1 \pm \sqrt{1-4t}}{2}$ $x = \frac{\sqrt{1-4t}-1}{2}$ or $x = \frac{-\sqrt{1-4t}-1}{2}$	2	✓Corr Substitution Regte vervanging ✓ $x = \frac{-1 \pm \sqrt{1-4t}}{2}$
3.1.2	$1-4t = \Delta$ Non real roots $\Delta < 0$ $1-4t < 0$ $-4t < -1$ $t > \frac{1}{4}$	3	✓ $\Delta = 0$ ✓ $1-4t = \Delta$ ✓Answer/Antwoord
3.2	$2x^2 + x = 0$ $b^2 - 4ac = \Delta$ $1-4(1)(0) = \Delta$ $\Delta = 1$ The roots are Real, Rational and unequal OR $2x + x = 0$ $x(2x+1) = 0$ $x = 0$ or $x = -\frac{1}{2}$	3	✓ $\Delta = 1-4(1)(0)$ ✓ $\Delta = 1$ ✓ Rational& unequal Rasionaal &ongelyk OR ✓Factors/Faktore ✓Values of x Waardes van x ✓Rational& unequal Rasionaal en ongelyk
3.3	For equal roots $\Delta = 0$ $b^2 - 4ac = 0$ $(-2)^2 - 4(1)(-2r) = 0$ $4 + 8r = 0$ $r = -\frac{1}{2}$	3	✓ $\Delta = 0$ ✓Corr Substitution Regte vervanging ✓Answer/Antwoord
		[11]	

QUESTION 4

4.1.1	$(0{,}125)^{-\frac{1}{3}}$ $=\left(\frac{1}{8}\right)^{-\frac{1}{3}}$ $=(2)^{3\left(\frac{1}{3}\right)}$ $=2$	3	✓ $\left(\frac{1}{8}\right)^{-\frac{1}{3}}$ ✓ $(2)^{3\left(\frac{1}{3}\right)}$ ✓Answer/Antwoord
4.1.2	$\frac{9^{n-1}.27^{3-2n}}{81^{42-n}}$ $=\frac{3^{2n-2}.3^{3(3-2n)}}{3^{4(2-n)}}$ $=\frac{3^{2n-2}.3^{9-6n}}{3^{4(2-n)}}$ $=3^{2n-6n+4n}.3^{9-2-8}$ $=3^{0}\cdot 3^{-1}$ $=\frac{1}{3}$	5	✓Express as base 3 Druk uit as basis 3 ✓Remove brackets Verwyde hakies ✓All as numerator Alles as teller ✓ $3^{0}\cdot 3^{-1}$ ✓ Answer/Antwoord
4.1.3	$\log_3 15-\log_3 10+\log_3 18$ $=\log_3\frac{15\cdot 18}{10}$ $=\log_3 27$ $=\log_3 3^3$ $=3\log_3 3$ $=3$	4	✓ $\frac{15\cdot 18}{10}$ ✓ $\log_3 27$ ✓ $3\log_3 3$ ✓Answer/Antwoord
4.2.1	$2^{\frac{x^2}{2}}=4^x$ $2^{\frac{x^2}{2}}=2^{2x}$ $\frac{x^2}{2}=2x$ $x^2=4x$ $x(x-4)=0$ $x=4 \ \ or \ \ x=0$	5	✓ 2^{2x} ✓Equate exponents Verg gelyk stel ✓Standard form Standaardvorm ✓Factors Faktore ✓Both x values Beide x-waardes

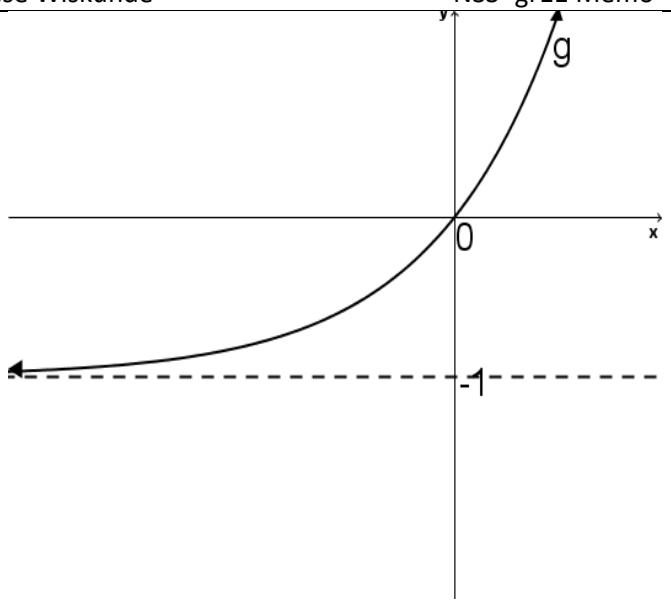
4.2.2	$3.2^x - 2^{x-1} = 80$ $2^x\left(3-\frac{1}{2}\right) = 80$ $2^x\left(\frac{5}{2}\right) = 80$ $2^x = 32$ $2^x = 2^5$ $x = 5$	4	✓Common Factor Gem. faktor ✓Simplify bracket Verwyder hakies ✓ $2^x = 2^5$ ✓Answer/Antwoord
4.2.3	$5^x = 2$ $\log_5 2 = x$ $x = 0{,}43$ *OR* $\log 5^x = \log 2$ $x\log 5 = \log 2$ $x = \frac{\log 2}{\log 5}$ $x = \log_5 2$ $x = 0{,}43$	2	✓As a log equation As 'n log verg. ✓Answer/Antwoord OR ✓x Subject /onderwerp ✓Answer/Antwoord
4.2.4	$2\log x = 2$ $\log x = 1$ $x = 10^1$ $x = 10$	3	✓dived by 2 Deel deur 2 ✓ Exponential Equation/Verg. ✓Answer/Antwoord
4.2.5	$\log(x^2 + x - 2) - 1 = 0$ $\log(x^2 + x - 2) = 1$ $\log(x^2 + x - 2) = \log 10$ $x^2 + x - 2 = 10$ $x^2 + x - 12 = 0$ $(x-3)(x+4) = 0$ $x = 3 \quad or \quad x = -4$	5	✓Transpose 1 ✓Remove logs Verwyder logs ✓Standard form Standaardvorm ✓Factors Faktore ✓Both values of x Beide waardes van x
		[29]	

QUESTION 5

5.1	$q=-2$ $h(x)=\frac{a}{x}+q$ $h(x)=\frac{a}{x}-2$ $-1=\frac{a}{2}-2$ $a=2$	3	✓ $q=-2$ ✓Substitute x,y and q Vervang x,y en q ✓ Answer/Antwoord
5.2	$m>0\ \therefore\ m=1$ $c=-2$ $y=(1)x-2$ $y=x-2$	3	✓ $m=1$ ✓ $c=-2$ ✓ Answer/Antwoord
5.3	$h(x)=\frac{2}{x}-2$ $r(x)=\frac{2}{x}-2+3$ $r(x)=\frac{2}{x}+1$ $\therefore y=1$	2	✓ $\frac{2}{x}-2+3$ ✓ Answer/Antwoord
		[8]	

QUESTION 6

6.1	$y=-1$	1	✓ $y=-1$
6.2	$g(x)=3^x-1$ $0=3^x-1$ $3^x=1$ $3^x=3^0$ $x=0$	3	✓ $0=3^x-1$ ✓ 3^0 ✓ $x=0$

6.3		3	✓Shape Vorm ✓Intercept Afsnit ✓Asymptote Asimptoot
6.4	$y > -1$ OR $y \in (-1; \infty)$	1	✓ Answer/Antwoord
		[8]	

QUESTION 7

7.1	$y = -x^2 - x + 6$ $0 = x^2 + x - 6$ $0 = (x+3)(x-2)$ $x = -3$ or $x = 2$ Length of AB= 5 units	4	✓Equate to 0 Stel gelyk aan 0 ✓Factors Faktore ✓Both x values Beide x-waardes ✓ Answer/Antwoord
7.2	B(0;6)	1	✓ Answer/Antwoord
7.3	$x = -\frac{b}{2a}$ $x = -\frac{(-1)}{2(-1)}$ $x = -\frac{1}{2}$	4	✓ $x = \frac{-b}{2a}$ ✓ $x = \frac{1}{2}$ ✓ $f\left(\frac{-1}{2}\right)$

	$f\left(-\frac{1}{2}\right)=-\left(-\frac{1}{2}\right)^2-\left(-\frac{1}{2}\right)+6 \quad OR \quad y=\frac{4ac-b^2}{4a}$ $=\frac{25}{4}$ $=\frac{25}{4}$		✓ $y=\frac{25}{4}$
7.4	$x_D=-\frac{1}{2} \quad and \quad x_C=0$ Average gradient $=\frac{f\left(-\frac{1}{2}\right)-f(0)}{-\frac{1}{2}-0}$ $=\frac{\frac{25}{4}-6}{-\frac{1}{2}}$ $=-\frac{1}{2}$	3	✓Numerator Teller ✓ denominator Noemer ✓ Answer/Antwoord
7.5	$x \in (-\infty;2]$ OR $x \leq 2$	2	✓ Notation Skryfwyse ✓ End Values Eindwaardes
		[**14]**	