



## **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**

**MATHEMATICS P1/WISKUNDE V1 MEMORANDUM**

**MID –YEAR EXAMINATION 2018/  
HALF-JAAR EKSAMEN 2018**

**MARKS: 100**

**PUNTE: 100**



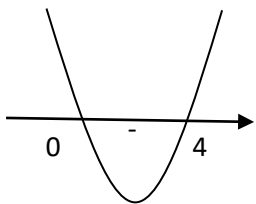
**This memorandum consists of 8 pages.**

**Hierdie memorandum bestaan uit 8 blabsye.**

## QUESTION/VRAAG 1

1.1.1	$(3x-1)(x+3) = 0$ $x = \frac{1}{3} \quad \text{or/of} \quad x = -3$	✓ Equating to 0 / Gelykstelling aan 0  ✓ Both Answers / Beide antwoorde (2)
1.1.2.	$(3x-1)(x+3) = -5$ $3x^2 + 8x + 2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(8) \pm \sqrt{(8)^2 - 4(3)(2)}}{2(3)}$ $x = \frac{-8 \pm \sqrt{40}}{6}$ $x = -0,28 \quad \text{or/of} \quad x = -2,39$	✓ $3x^2 + 8x + 2 = 0$ ✓ formula/formule  ✓ sub. into correct formula/ invervang in korrekte formule  ✓ $x = \frac{-8 \pm \sqrt{40}}{6}$  ✓ answers/antwoorde (5)
1.2.1	$\sqrt{x+2} + x = 4$ $\sqrt{x+2} = 4 - x$ $x+2 = 16 - 8x + x^2$ $x^2 - 9x + 14 = 0$ $(x-7)(x-2) = 0$ $x = 7 \text{ N/A/ N.V.T} \quad \text{or/of} \quad x = 2$	✓ $\sqrt{1+x} = 4 - x$  ✓ squaring/kwadrering  ✓ standard form/standaard vorm  ✓ factors/faktore  ✓ answer/antwoord (5)
1.2.2	$4(x^2 - x) - \frac{2}{x^2 - x} = 7$ <p>Let/Laat <math>x^2 - x = k</math></p> $4k - \frac{2}{k} = 7$ $4k^2 - 7k - 2 = 0$ $(4k+1)(k-2) = 0$	✓ $x^2 - x = k$  ✓ std form in k /stdvorm in k  ✓ factors/faktore  ✓ vales of k/waardes van k



	$k = -\frac{1}{4} \quad \text{or / of} \quad k = 2$ $x^2 - x = -\frac{1}{4} \quad \text{or / of} \quad x^2 - x = 2$ $4x^2 - 4x + 1 = 0 \quad \text{or / of} \quad x^2 - x - 2 = 0$ $(2x - 1)(2x - 1) = 0 \quad \text{or / of} \quad (x - 2)(x + 1) = 0$ $x = \frac{1}{2} \quad \text{or / of} \quad x = 2 \quad \text{or / of} \quad x = -1$	<p>✓ 2 eqs. in <math>x/2</math> vgl's in <math>x</math></p> <p>✓✓ 3 values of <math>x</math>/ 3 waardes van <math>x</math> (7)</p>
1.2.3	$3^{x-2} + 3^{x+1} = 28$ $3^x(3^{-2} + 3^1) = 28$ $3^x\left(\frac{28}{9}\right) = 28$ $3^x = 9$ $3^x = 3^2$ $x = 2$	<p>✓ taking CF outside/ faktoriserings van GF</p> <p>✓ simplification/ vereenvoudiging</p> <p>✓ <math>3^x = 9</math></p> <p>✓ answer/antwoord (4)</p>
1.2.4	$x^2 \leq 4x$ $x^2 - 4x \leq 0$ $x(x - 4) \leq 0$ $0 \leq x \leq 4$	 <p>✓ <math>x^2 - 4x \leq 0</math></p> <p>✓ factors/faktore</p> <p>✓ end values/kritieke waardes</p> <p>✓ notation/notasie (4)</p>
1.3	$x - 3 - y = 0 \quad \text{and/en} \quad xy = -2$ $x = y + 3$ $(y + 3)y = -2$ $y^2 + 3y + 2 = 0$ $(y + 2)(y + 1) = 0$ $y = -2 \quad \text{or / of} \quad y = -1$ $x = -2 + 3 = 1 \quad \text{or / of} \quad x = -1 + 3 = 2$	<p>✓ <math>x = y + 3</math></p> <p>✓ sub. of/invert van <math>x</math></p> <p>✓ std form/std vorm</p> <p>✓ factors/faktore</p> <p>✓ <math>y</math> values/<math>y</math>-waardes</p> <p>✓✓ <math>x</math> values/<math>x</math>-waardes (7)</p>



**QUESTION/VRAAG 2**

2.1	$x = 3 \pm \sqrt{18 - 2a^2}$ <p>For equal roots/Vir gelyke wortels, <math>\Delta = 0</math></p> $18 - 2a^2 = 0$ $a^2 = 9$ $a = \pm 3$	$\checkmark \Delta = 0$ $\checkmark 18 - 2a^2 = 0$  $\checkmark a = \pm 3$ (3)
2.2.1	$(a + 3)^2 + 12$ $(a + 3)^2$ is always positive /is altyd positief $(a + 3)^2 + 12$ will also positive/sal altyd positief wees Roots are real / Wortels is reël	$\checkmark \Delta \geq 0$ $\checkmark$ Roots are real/ Wortels is reël (2)
2.2.3	$-4(a - b)^2 < 0$ Roots are non-real / Wortels in nie-reël	$\checkmark -4(a - b)^2 < 0$ $\checkmark$ Roots are non-real / Wortels is nie-reël (2) NB: Accept Irrational/ Aanvaar Irrasionaal

**QUESTION/VRAAG 3**

3.1.1	$\sqrt[4]{\frac{3^a \cdot 9^{a+1}}{27^{a+2}}} = \sqrt[4]{\frac{3^a \cdot 3^{2(a+1)}}{3^{3(a+2)}}}$ $= \sqrt[4]{3^{3a+2-3a-6}}$ $= \sqrt[4]{3^{-4}}$ $= \frac{1}{3}$	$\checkmark \sqrt[4]{\frac{3^a \cdot 3^{2(a+1)}}{3^{3(a+2)}}}$ $\checkmark \sqrt[4]{3^{3a+2-3a-6}}$ $\checkmark$ answer / antwoord (3)
3.1.2	$\frac{2^{x+3} - 3 \cdot 2^{x-1}}{2^{x-2}} = \frac{2^x(8 - 3 \cdot 2^{-1})}{2^x \cdot 2^{-2}}$ $= \frac{8 - \frac{3}{2}}{\frac{1}{4}}$ $= 26$	$\checkmark$ taking common factor outside / faktorisering gemeensk faktor  $\checkmark \frac{8 - \frac{3}{2}}{\frac{1}{4}}$  $\checkmark$ answer/antwoord (3)



3.2	$10^{x+3} = 10^x \cdot 10^3$ $= 1,7 \times 1000$ $= 1700$	$\checkmark 10^x \cdot 10^3$  $\checkmark$ answer/antwoord (2)
3.3	$2 \cdot 9^a + 3 \cdot 2^{-b} = 2 \cdot 3^{2a} + 3 \cdot 2^{-b}$ $= 2 \cdot (p)^2 + 3 \cdot (q)^{-1}$ $= 2p^2 + \frac{3}{q}$	$\checkmark 3^{2a}$  $\checkmark$ sub of $p$ and $q$ ./ Invervanging van $p$ en $q$  $\checkmark 2p^2 + \frac{3}{q}$ (3)

**QUESTION/VRAAG 4**

4.1	$\begin{array}{cccc} 4 & ; & 9 & ; & x & ; & 37 \\ & \swarrow & \searrow & \swarrow & \searrow & \swarrow & \searrow \\ & 5 & & x-9 & & 37-x & \\ & \swarrow & \searrow & \swarrow & \searrow & & \\ & x-14 & & 46-2x & & & \end{array}$ $x - 14 = 46 - 2x$ $x = 20$	$\checkmark$ correct first differences/ korrekte eerste verskille  $\checkmark$ second differences / tweede verskille  $\checkmark$ answer / antwoord (3)
4.2	$\begin{array}{lll} 2a = 6 & 3a + b = 5 & a + b + c = 4 \\ a = 3 & 3 \cdot 3 + b = 5 & 3 + (-4) + c = 4 \\ & b = -4 & c = 5 \end{array}$ $T_n = an^2 + bn + c$ $= 3n - 4n + 5$	$\checkmark$ value of/waarde van $a$ $\checkmark$ value of/waarde van $b$ $\checkmark$ value of/waarde van $c$  $\checkmark$ answer/antwoord (4)
4.3	$3n^2 - 4n + 5 = 212$ $3n^2 - 4n - 207 = 0$ $n = \frac{4 \pm \sqrt{16 - 4(3)(-207)}}{6}$ $= 9 \text{ or / of } \frac{-23}{3}$ $n = 9$	$\checkmark$ equating to 212 / gelykstelling aan 212  $\checkmark$ standard form/std vorm  $\checkmark$ values of/waardes van $n$  $\checkmark$ answer/antwoord (4)



## QUESTION/VRAAG 5

5.1.1	$i_{eff} = \left(1 + \frac{i}{m}\right)^m - 1$ $= \left(1 + \frac{0,075}{12}\right)^{12} - 1$ $= 0,07763259\dots$ <p>Rate/Koers = 7,76%</p>	<p>✓ formula/formule</p> <p>✓ correct sub. into formula/ korrekte inverv. in formule</p> <p>✓ answer /antwoord (3)</p>
5.1.2	$A = P(1+i)^n$ $= 120000 \left(1 + \frac{0,075}{12}\right)^{4 \times 12}$ $= R 161831,90$	<p>✓ formula/formule</p> <p>✓ sub. into the formula/ inv. in formule</p> <p>✓ answer/antwoord (3)</p>
5.2	$A = P(1-i)^n$ $= 80000(1-0,12)^3$ $= R54517,76$	<p>✓ formula/formule</p> <p>✓ sub. into the formula/ inv. in formule</p> <p>✓ answer/antwoord (3)</p>
5.3	$x\left(1 + \frac{0,12}{4}\right)^{12} \left(1 + \frac{0,14}{6}\right)^4 = 95000$ $x\left(1 + \frac{0,12}{4}\right)^{12} \left(1 + \frac{0,14}{2}\right)^4 = 95000$ $x(1,868881682) = 95000$ $x = R50832,54$	<p>✓ <math>\left(1 + \frac{0,12}{4}\right)^{12}</math></p> <p>✓ <math>\left(1 + \frac{0,14}{2}\right)^4</math></p> <p>✓ equating to/gelykstelling aan 95000</p> <p>✓ 1,868881682</p> <p>✓ answer/antwoord (5)</p>

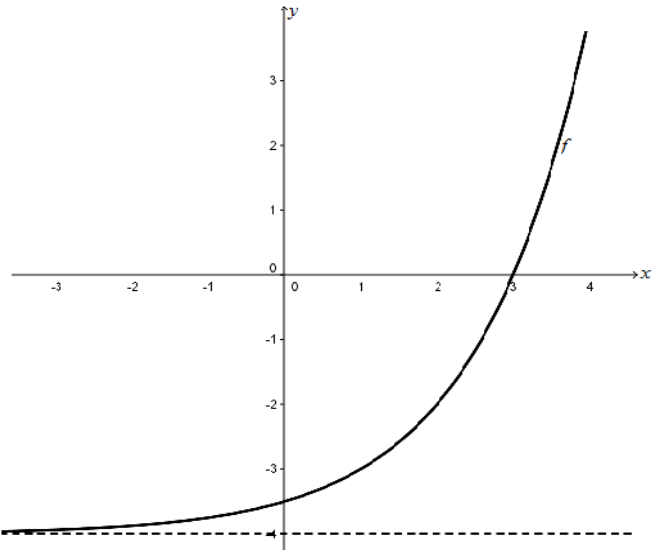
## QUESTION/VRAAG 6

6.1	$g(x) = \frac{a}{x-2} + 6$ $0 = \frac{a}{\frac{5}{2}-2} + 6$ $a = -3$	<p>✓ value of/waarde van <math>p</math></p> <p>✓ value of/waarde van <math>q</math></p> <p>✓ value of/waarde van <math>a</math></p> <p>✓ equation/vergelyking (4)</p>
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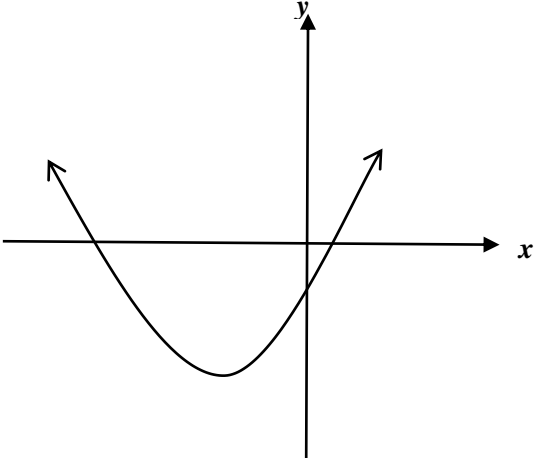


	$g(x) = \frac{-3}{x-2} + 6$	
6.2	$x \in R, x \neq 2$	✓ answer/antwoord (1)
6.3	$2 < x \leq \frac{5}{2}$	✓ end points/kritieke waardes ✓ correct notation/korrekte notasie (2)
6.4	$F\left(\frac{3}{2}; 12\right)$	✓ x coordinate/koördinaat ✓ y coordinate/koördinaat (2)

**QUESTION/VRAAG 7**

7.1.1	$y = -4$	✓ $y = -4$
7.1.2	$f(x) = 2^{x-1} - 4$  $0 = 2^{x-1} - 4$ $2^{x-1} = 2^2$ $x = 3$  $(3; 0)$	✓ making/maak $y = 0$  ✓ $2^2$ ✓ $x = 3$  (3)
7.1.3	y- intercept /y-afsnit $y = y = 2^{0-1} - 4 = \frac{-7}{2}$  	✓ y-int/y-afsnit  ✓ x-int/x-afsnit  ✓ shape(increasing)/ vorm(stygend)  ✓ asymptote / asimptote (4)



7.1.4	Range/Waardeversameling is $y > -4$	✓ answer/antwoord (1)
7.1.5	$m = 2^{1-1} - 4 = -3$	✓ answer/antwoord (1)
7.2		✓ shape(concave up)/ vorm(konkaaf op)  ✓ x-intercepts (one +ve and one -ve)/ x-afsnitte ( een +tiewe en een - tiewe)  ✓ -ve y-intercept/ -tiewe y-afsnit  ✓ -ve axis of symmetry / -tiewe simmetrie-as (4)

