Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE/ NASIONALE SENIOR SERTIFIKAAT

GRADE/GRAAD 11

NOVEMBER 2015

MATHEMATICS P1/WISKUNDE V1 MEMORANDUM

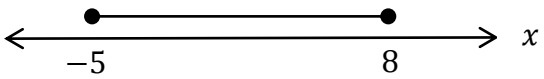
MARKS/PUNTE: 150

Hierdie memorandum bestaan uit 14 bladsye./
This memorandum consists of 14 pages.

NOTE/LET OP:

- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.
  Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, merk SLEGS die EERSTE poging.
- Consistent accuracy applies in ALL aspects of the memorandum.
  Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die memorandum.
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.
  Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.
- The mark for substitution is awarded for substitution into the correct formula.
  Die punt vir substitusie word toegeken vir substitusie in die korrekte formule.

QUESTION 1/VRAAG 1

1.1.1	$x^2 - 7x + 12 = 0$ $(x - 4)(x - 3) = 0$ $x = 4$ or/of $x = 3$ Answer ONLY: 1 mark. SLEGS antwoord: 1 punt.	✓ factors/faktore ✓ x-values/waardes (2)
1.1.2	$6x - 7 = \frac{4}{x}$ $6x^2 - 7x = 4$ $6x^2 - 7x - 4 = 0$ $x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(6)(-4)}}{2(6)}$ $x = \frac{7 \pm \sqrt{145}}{12}$ $x = 1{,}59$ or/of $x = -0{,}42$ Penalise 1 mark for incorrect rounding off. Penaliseer 1 punt vir verkeerde afronding. If answer left in surd form: 3 marks. Indien antwoord in wortelvorm gelaat: 3 punte.	✓ standard form/standaardvorm ✓ substitution/substitusie ✓✓ x-values/waardes (4)
1.2.1	$x^2 - 3x \leq 40$ $x^2 - 3x - 40 \leq 0$ $(x - 8)(x + 5) \leq 0$ $-5 \leq x \leq 8$ **OR/OF** $x \in [-5; 8]$ **OR/OF**  Note/Let op: If/As $x \leq -5$ or/of $x \leq 8$: max./maks. 2 marks/punte. If correct graphical solution but concludes incorrectly: max. 3 marks. As korrekte grafiese oplossing, maar maak verkeerde gevolgtrekking: maks. 3 punte.	✓ standard form/standaardvorm ✓ factors/faktore ✓ critical values/kritieke waardes ✓ solution/oplossing (4)

1.2.2	$-4x + 3 < -2$ $-4x < -5$ $x > \frac{5}{4}$	✓ $-4x < -5$ ✓ solution/oplossing (2)
1.2.3	$x \in \{2; 3; 4; 5; 6; 7; 8\}$ If/As $2 \leq x \leq 8$, 1 mark/punt.	✓ 4 values/waardes ✓ 7 values/waardes (2)
1.3.1	$m + \frac{1}{m} = 3$ $\left(m + \frac{1}{m}\right)^2 = 9$ $m^2 + 2 + \frac{1}{m^2} = 9$ $m^2 + 2 - 3 + \frac{1}{m^2} = 9 - 3$ $m^2 - 1 + \frac{1}{m^2} = 6$ Answer ONLY: 1 mark. SLEGS antwoord: 1 punt. If answer = 8: 2 marks./As antwoord = 8: 2 punte. Used/gebruik $m^2 + \frac{1}{m^2} = 9$ If answer = 10: 1 mark./As antwoord = 10: 1 punt	✓ squaring/kwadrering ✓ simplification/vereenvoudiging ✓ answer/antwoord (3)
1.3.2	$m^3 + \frac{1}{m^3} = \left(m + \frac{1}{m}\right)\left(m^2 - 1 + \frac{1}{m^2}\right)$ $= (3)(6)$ $= 18$ If no factors shown but correct answer: 0 marks. As geen faktore maar regte antwoord: 0 punte.	✓ factors/faktore ✓ answer/antwoord (2)
		[19]

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QUESTION 2/VRAAG 2

2.1.1	$\frac{\sqrt{50}+\sqrt{8}}{7\sqrt{2}}$ $= \frac{5\sqrt{2}+2\sqrt{2}}{7\sqrt{2}}$ $= \frac{7\sqrt{2}}{7\sqrt{2}}$ $= 1$ Answer ONLY: 0 marks. SLEGS antwoord: 0 punte. **OR/OF** $\frac{\sqrt{50}+\sqrt{8}}{7\sqrt{2}}$ $= \frac{(50)^{\frac{1}{2}}+(8)^{\frac{1}{2}}}{7.(2)^{\frac{1}{2}}}$ $= \frac{(5^2.2)^{\frac{1}{2}}+(2^3)^{\frac{1}{2}}}{7.(2)^{\frac{1}{2}}}$ $= \frac{5.(2)^{\frac{1}{2}}+(2)^{\frac{3}{2}}}{7.(2)^{\frac{1}{2}}}$ $= \frac{(2)^{\frac{1}{2}}[5+2]}{7.(2)^{\frac{1}{2}}}$ $= \frac{7}{7}$ $= 1$	✓ $5\sqrt{2} + 2\sqrt{2}$ ✓ $7\sqrt{2}$ ✓ answer/antwoord ✓ $5.(2)^{\frac{1}{2}} + (2)^{\frac{3}{2}}$ ✓ $7.(2)^{\frac{1}{2}}$ ✓ answer/antwoord (3)
2.1.2	$\left[\frac{16x^{\frac{-5}{6}}}{81\sqrt{x}}\right]^{\frac{-3}{4}}$ $= \left[\frac{2^4x^{\frac{-5}{6}}}{3^4x^{\frac{1}{2}}}\right]^{\frac{-3}{4}}$ $= \left[\frac{3^4x^{\frac{1}{2}}}{2^4x^{\frac{-5}{6}}}\right]^{\frac{3}{4}}$ OR/OF $= \frac{2^{-3}x^{\frac{5}{8}}}{3^{-3}x^{\frac{-3}{8}}}$ $= \frac{3^3x^{\frac{3}{8}}}{2^3x^{\frac{-5}{8}}}$ $= \frac{3^3x}{2^3}$ $= \frac{27x}{8}$ $= \frac{27x}{8}$	✓ 3^4; 2^4 and/en $x^{\frac{1}{2}}$ ✓ rule/reël ✓ rule/reël ✓ answer/antwoord (4)
2.2	$27^{x^2+x} = 3^{3x^2} \times 9$ $(3^3)^{x^2+x} = 3^{3x^2} \times 3^2$ $3^{3x^2+3x} = 3^{3x^2} \times 3^2$ $\therefore 3x^2 + 3x = 3x^2 + 2$ $3x = 2$ $x = \frac{2}{3}$	✓ 3^{3x^2+3x} ✓ $3x^2 + 3x = 3x^2 + 2$ ✓ answer/antwoord (3)

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2.3	$\frac{2^{x-1}+2^{x+1}}{5\times10^{x}}$ $=\frac{2^{x}(2^{-1}+2)}{5\times5^{x}\times2^{x}}$ $=\frac{2^{-1}+2}{5\times5^{x}}$ $=\frac{\frac{1}{2}+2}{5\times5^{x}}$ $=\frac{2\frac{1}{2}\times5^{-x}}{5}$ $=\frac{2\frac{1}{2}\times10}{5}$ $=\frac{25}{5}$ $=5$ **OR/OF** If/As $5^{-x}=10$ then/dan $5^{x}=10^{-1}=\frac{1}{10}$ $\frac{2^{x-1}+2^{x+1}}{5\times10^{x}}$ $=\frac{2^{x}(2^{-1}+2)}{5\times5^{x}\times2^{x}}$ $=\frac{2^{-1}+2}{5\times5^{x}}$ $=\frac{\frac{1}{2}+2}{5\times5^{x}}$ $=\frac{2\frac{1}{2}}{5\times\frac{1}{10}}$ $=\frac{2\frac{1}{2}}{\frac{1}{2}}$ $=5$	✓ $2^{x}(2^{-1}+2)$ ✓ $5^{x}\times2^{x}$ ✓ $\frac{1}{2}+2$ ✓ 5^{-x} ✓ 5 Answer ONLY: 0 marks. SLEGS antwoord: 0 punte. ✓ $2^{x}(2^{-1}+2)$ ✓ $5^{x}\times2^{x}$ ✓ $\frac{1}{2}+2$ ✓ $5^{x}=\frac{1}{10}$ ✓ 5 (5)
		[15]

QUESTION 3/*VRAAG 3*

3.1	$x + y + 2 = 0$ $x = -y - 2$ $x^2 + y^2 = 4$ $(-y - 2)^2 + y^2 = 4$ $y^2 + 4y + 4 + y^2 = 4$ $2y^2 + 4y = 0$ $2y(y + 2) = 0$ $y = 0$ or/of $y = -2$ $x = -2$ or/of $x = 0$	$x + y + 2 = 0$ $y = -x - 2$ $x^2 + y^2 = 4$ $x^2 + (-x - 2)^2 = 4$ $x^2 + x^2 + 4x + 4 = 4$ $2x^2 + 4x = 0$ $2x(x + 2) = 0$ $x = 0$ or/of $x = -2$ $y = -2$ or/of $y = 0$	✓ $x = -y - 2$ / $y = -x - 2$ ✓ substitution/substitusie ✓ standard form/standaardvorm ✓ factors/faktore ✓ y-values /-waardes ✓ x-values/-waardes (6)
3.2.1	$b^2 - 4ac = (+)^2 - 4(-)(0) \ = (+)^2$ Roots are rational and unequal Wortels is rasionaal en ongelyk No mark for answer if no method is shown. Geen punt vir antwoord as geen metode aangedui word nie. If candidate includes "non-real": max 1 mark. As kandidaat "nie-reëel' insluit: maks 1 punt.		✓ method/metode ✓ rational AND unequal/ rasionaal EN ongelyk (2)
3.2.2	$b^2 - 4ac = b^2 - 4b^2 \ = -3b^2$ No mark for answer if no method is shown. Geen punt vir antwoord as geen metode aangedui word nie. No marks if contradictions are given, e.g. unequal. Geen punt as teenstrydighede genoem word nie, bv. ongelyk. Roots are nonreal/Wortels is nie-reëel.		✓ $-3b^2$ ✓ answer/antwoord (2)
3.3	$2x^2 + 4x + 4 - p^2 = 0$ $b^2 - 4ac = 16 - 4(2)(4 - p^2)$ $= 16 - 32 + 8p^2$ $= 8p^2 - 16$ For non-real solution/ Vir nie-reële wortels: $8p^2 - 16 < 0$ $p^2 - 2 < 0$ $(p - \sqrt{2})(p + \sqrt{2}) < 0$ $-\sqrt{2} < p < \sqrt{2}$		✓ substitution/substitusie ✓ statement/stelling ✓ critical values/kritieke waardes ✓ answer/antwoord (4)
			[14]

QUESTION 4/VRAAG 4

4.1	$88\ ;\ 84$	✓ $88\ ;\ 84$ (1)
4.2	$T_n = -4n + 96$ **OR/OF** $T_n = 92 + (n-1)(-4)$	✓ $-4n$ ✓ 96 ✓ $d = -4$ ✓ substitution/substitusie (2)
4.3	$T_{18} = -4(18) + 96$ **OR/OF** $T_{18} = 92 + 17(-4)$ $= 24$ $= 24$	✓ substitution/substitusie ✓ answer/antwoord (2)
4.4	$T_p + T_q = 0$ $96 - 4p + 96 - 4q = 0$ $-4p - 4q = -192$ $p + q = 48$ **OR/OF** $92; 88; 84; 80; 76; 72; 68; 64; 60; 56; 52; 48; 44;$ $40; 36; 32; 28; 24; 20; 16; 12; 8; 4; 0; -4;$ ... $T_{23} + T_{25} = 4 + (-4) = 0$ $p + q = 48$	✓ substitution/substitusie ✓ answer/antwoord Answer ONLY: 1 mark. SLEGS antwoord: 1 punt. ✓ expansion/uitbreiding ✓ answer/antwoord (2)
		[7]

QUESTION 5/VRAAG 5

5.1.1	2	✓ answer/antwoord (1)
5.1.2	$2a = 2$ $a = 1$ $3a + b = 2$ $3 + b = 2$ $b = -1$ $a + b + c = 41$ $1 - 1 + c = 41$ $c = 41$ $T_n = n^2 - n + 41$ **OR/OF** $T_n = an^2 + bn + c$ $a + b + c = 41$ (1) $4a + 2b + c = 43$ (2) $9a + 3b + c = 47$ (3) $(2) - (1)$ $3a + b = 2$ $(3) - (2)$ $5a + b = 4$ $2a = 2$ $a = 1$ $b = -1$ $c = 41$ $T_n = n^2 - n + 41$ Answer ONLY: 3 marks. SLEGS antwoord: 3 punte.	✓ a-value/waarde ✓ b-value/waarde ✓ c-value/waarde ✓ answer/antwoord ✓ a-value/waarde ✓ b-value/waarde ✓ c-value/waarde ✓ answer/antwoord (4)
5.1.3	$T_{41} = 41^2 - 41 + 41 = 1681$ 41 is also a factor/41 is ook 'n faktor. ∴ Factors/faktore: $1, 1681$ and/en 41. ∴ 1681 is not prime/nie priem nie.	✓ 1681 ✓ argument (2)
5.1.4	Units digits/enesyfers: 1,3,7,3,1 , 1,3,7,3,1 , 1,3,7,3,1, ... $49\,999\,998 \div 5 = 9\,999\,999{,}6$ Decimal/desimaal $= 0{,}6 = \frac{3}{5}$ Units digit/enesyfer $= 7$ Answer ONLY: 2 marks. SLEGS antwoord: 2 punte.	✓ identify pattern/identifiseer patroon ✓ answer/antwoord (2)
5.2.1	$T_6 + T_7 = -5(6) - 4 - (7)^2 + 6$ $= -30 - 4 - 49 + 6$ $= -77$	✓ $-5(6) - 4$ ✓ $-(7)^2 + 6$ ✓ answer/antwoord (3)

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5.2.2	$-5k - 4 = -219$ $-5k = -215$ $k = 43$ $-k^2 + 6 = -219$ $k^2 = 225$ $k = 15$ $\therefore k = 15$ If ONLY/Indien SLEGS: $-k^2 + 6 = -219$ $k^2 = 225$ $k = 15$ 4 marks/punte. If continues and mentions that $k = 15$ is uneven: 5 marks. As voortgaan en meld dat $k = 15$ is onewe: 5 punte	✓ $-5k - 4 = -219$ ✓ answer/antwoord ✓ $-k^2 + 6 = -219$ ✓ answer/antwoord ✓ choice/keuse (5)
		[17]

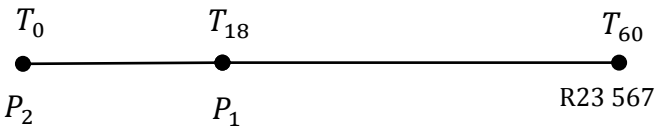
If expansion that leads to correct answer: 5 marks.
As uitbreiding wat tot korrekte antwoord lei: 5 punte.
If ONLY expansion: 2 marks.
Indien SLEGS uitbreiding: 2 punte.

n = **uneven**	**1**	**3**	**5**	**7**	**9**	**11**	**13**	***15***						
T_n	5	-3	-19	-43	-75	-115	-163	***-219***						
n = **even**	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**
T_n	-14	-24	-34	-44	-54	-64	-74	-84	-94	-104	-114	-124	-134	-144
n = **even**	**30**	**32**	**34**	**36**	**38**	**40**	***42***	***44***						
T_n	-154	-164	-174	-184	-194	-204	***-214***	***-224***						

QUESTION 6/VRAAG 6

6.1	$A = P(1 - i)^n$ $A = 540\,000(1 - 0{,}11)^8$ $A = R212\,575{,}80$ Wrong formule/verkeerde formule: 0 marks/punte.	✓ substitution/substitusie ✓ answer/antwoord (2)
6.2	$1 + i_{eff} = \left(1 + \frac{0{,}115}{4}\right)^4$ $1 + i_{eff} = 1{,}12005 \ldots$ $i_{eff} = 0{,}12005 \ldots$ $= 12{,}01\%$ Wrong formule/verkeerde formule: 0 marks/punte. If answer given as 12%: 2 marks. Indien antwoord gegee as 12%: 2 punte.	✓ substitution/substitusie ✓ 1,12005 ... ✓ answer/antwoord (3)
6.3.1	$A = 15\,000(1 + 0{,}087 \times 8) + \frac{3}{100} \times 15\,000$ $= 25\,440 + 450$ $=$ R25 890 If ONLY/Indien SLEGS: $15\,000(1 + 0{,}087 \times 8)$ 1 mark/punt.	✓ $15\,000(1 + 0{,}087 \times 8)$ ✓ $\frac{3}{100} \times 15\,000$ ✓ answer/antwoord (3)
6.3.2	$A = 15\,000\left(1 + \frac{0{,}069}{12}\right)^{96}$ $=$ R26 009,69 Wrong formule/ Verkeerde formule: 1 mark/punt for/vir i.	✓ $i = \frac{0{,}069}{12}$ ✓ substitution/substitusie ✓ answer/antwoord (3)

6.4



$P_2 = \left[23\,564\left(1+\frac{0,12}{12}\right)^{-42} + 2000\right]\left(1+\frac{0,12}{12}\right)^{-18}$
$= \text{R}14\,642,83$

✓ $i = \frac{0,12}{12}$
✓ $23\,564\left(1+\frac{0,12}{12}\right)^{-42}$
✓ $+2000$
✓ $\left(1+\frac{0,12}{12}\right)^{-18}$
✓ answer/antwoord

OR/OF

Wrong formule/ verkeerde formule: 1 mark/punt for/vir i

$P_1\left(1+\frac{0,12}{12}\right)^{42} = 23\,564$
$P_1 = \frac{23\,564}{\left(1+\frac{0,12}{12}\right)^{42}}$

✓ $i = \frac{0,12}{12}$
✓ $P_1\left(1+\frac{0,12}{12}\right)^{42} = 23\,564$

$P_2\left(1+\frac{0,12}{12}\right)^{18} = P_1 + 2\,000$
$P_2 = \frac{P_1+2\,000}{\left(1+\frac{0,12}{12}\right)^{18}}$
$P_2 = \text{R}14\,642,83$

✓ $P_1 + 2\,000$
✓ $P_2\left(1+\frac{0,12}{12}\right)^{18} = P_1 + 2\,000$
✓ answer/antwoord

OR/OF

$\left[x\left(1+\frac{0,12}{12}\right)^{18} - 2000\right]\left(1+\frac{0,12}{12}\right)^{42} = 23564$

✓ $i = \frac{0,12}{12}$
✓ $x\left(1+\frac{0,12}{12}\right)^{18} - 2000$
✓ $\left(1+\frac{0,12}{12}\right)^{42}$

$x\left(1+\frac{0,12}{12}\right)^{18} - 2000 = 15514,98340$
$x\left(1+\frac{0,12}{12}\right)^{18} = 17514,9834$
$x = \text{R}14642,83$

✓ $x\left(1+\frac{0,12}{12}\right)^{18} = 17514,9834$
✓ answer/antwoord

(5)

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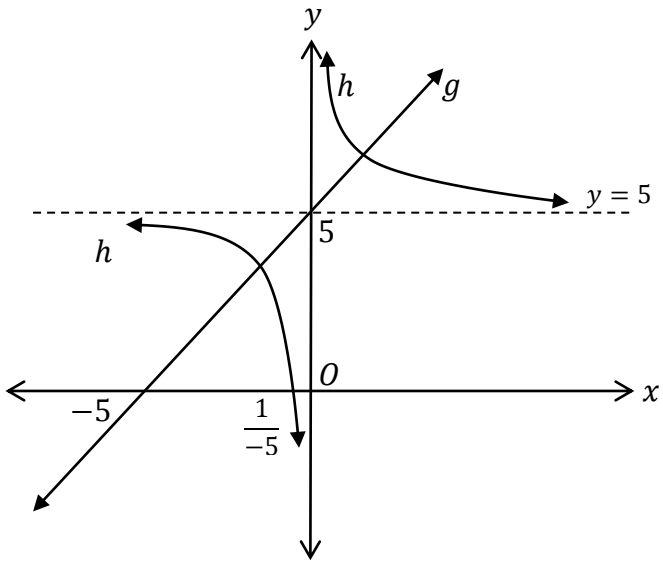
QUESTION 7/*VRAAG 7*

7.1	$h(x) = \frac{1}{x} + 5$ Let/stel $y = 0$ $0 = \frac{1}{x} + 5$ $0 = 1 + 5x$ $-5x = 1$ $x = \frac{1}{-5}$ Answer ONLY $x = \frac{1}{-5}$: 2 marks. SLEGS antwoord $x = \frac{1}{-5}$: 2 punte.	✓ $y = 0$ ✓ simplify/vereenvoudig ✓ answer/antwoord (3)
7.2		*h* ✓ x-intercept/afsnit ✓ asymptote/asimptoot ✓ shape/vorm *g* ✓ y-intercept/afsnit ✓ x-intercept/afsnit (5)
7.3	$x = 0$	✓ answer/antwoord (1)
7.4	$x + 5 = \frac{1}{x} + 5$ $x^2 + 5x = 1 + 5x$ $x^2 - 1 = 0$ $(x - 1)(x + 1) = 0$ $x = 1$ or/of $x = -1$ $(1; 6)$ or/of $(-1; 4)$	✓ equation/vergelyking ✓ simplify/vereenvoudig ✓ x-values/waardes ✓ $(1; 6)$ ✓ $(-1; 4)$ (5)
7.5	$f(x) = -x + 3$	✓ $-x$ ✓ 3 (2)
7.6	$h(x) = \frac{1}{x+2} + 3$	✓ $x + 2$ ✓ $+3$ (2)
		[18]

QUESTION 8/VRAAG 8

8.1	$f(x) = 2 \times a^x - 1$ $5 = 2.a^1 - 1$ $6 = 2a$ $a = 3$	✓ substitution/substitusie ✓ simplify/vereenvoudig (2)
8.2	$f(x) = 2.3^x - 1$ $y = 2.3^0 - 1$ $y = 2 - 1$ $y = 1$	✓ $x = 0$ ✓ $y = 1$ (2)
8.3	$y > -1$	✓ answer/antwoord (1)
8.4	$f(0{,}23) = 2 \times 3^{0,23} - 1$ $= 1{,}575$	✓ substitution/substitusie ✓ answer/antwoord (2)
8.5	$f(x) = -2 \times 3^{x+2} + 1$	✓ $x + 2$ ✓ $-2 \times 3^{x+2} + 1$ (2)
		[9]

QUESTION 9/VRAAG 9

9.1	$3y = x - 5$ Let/stel $y = 0$ $0 = x - 5$ $x = 5$ $(5; 0)$ Do not penalise if not in coordinate form. Moenie penaliseer indien nie in koördinaatvorm nie.	✓ $y = 0$ ✓ answer/antwoord (2)
9.2	$f(x) = a(x + 2)(x - 5)$ $(-1; 3)$ $3 = a(-1 + 2)(-1 - 5)$ $3 = a(1)(-6)$ $3 = -6a$ $a = \frac{1}{-2}$ NOTE/LET WEL: No reference can be made to 9.3/Geen verwysing kan na 9.3 gemaak word nie. $f(x) = \frac{1}{-2}(x + 2)(x - 5)$ $f(x) = \frac{1}{-2}(x^2 - 3x - 10)$ $f(x) = \frac{1}{-2}x^2 + \frac{3}{2}x + 5$	✓ setting up equation/ opstel van vergelyking ✓ substitution/substitusie $(-1; 3)$ ✓ a-value/waarde ✓ simplification/vereenvoudiging (4)

9.3	$x = \frac{-2+5}{2} = \frac{3}{2}$ OR/OF $x = \frac{-b}{2a} = \frac{\frac{-3}{2}}{2\left(\frac{-1}{2}\right)} = \frac{3}{2}$ $f\left(\frac{3}{2}\right) = \frac{-1}{2}\left(\frac{3}{2}\right)^2 + \frac{3}{2}\left(\frac{3}{2}\right) + 5$ $= 6\frac{1}{8}$ or/of $\frac{49}{8}$ or/of 6,125 $\left(\frac{3}{2}; 6\frac{1}{8}\right)$ Do not penalise if not in coordinate form. Moenie penaliseer indien nie in koördinaatvorm nie.	✓ $x = \frac{3}{2}$ ✓ $y = 6\frac{1}{8}$ (2)
9.4	E: $3y = x - 5$ Let/stel $x = -1$ $\therefore 3y = -1 - 5$ $3y = -6$ $y = -2$ $E(-1; -2)$ $DE = 5$ units/eenhede	✓ substitute/vervang $x = -1$ ✓ $y = -2$ ✓ answer/antwoord (3)
9.5	$D(-1; 3)$; $B(5; 0)$ $m = \frac{3-0}{-1-5} = \frac{3}{-6} = \frac{1}{-2}$	✓ answer/antwoord (1)
9.6	$x \leq -2$ or/of $0 \leq x \leq 5$	✓ $x \leq -2$ ✓ $0 \leq x \leq 5$ (2)
		[14]

QUESTION 10/*VRAAG 10*

10.1	$a = 9$ $b = 13$ $c = 9$ $e = 17 - d$ $f = 23 - d$ $23 - d + d + 17 - d + 8 + 9 + 10 + 13 + 9 = 84$ $-d + 89 = 84$ $d = 5$ **OR/OF** $23 - d + d + 17 - d + 8 + 9 + 10 + 13 = 75$ $-d + 80 = 75$ $d = 5$ $e = 12$ $f = 18$	✓ $a = 9$ ✓ $b = 13$ $CA: b = 22 - a$ ✓ $c = 9$ ✓ equation/vergelyking $CA: e = 26 - a - d$ $CA: f = 23 - d$ ✓ $d = 5$ ✓ $e = 12$ ✓ $f = 18$ (7)
10.2	P(at least 2 out of 3/ten minste 2 uit 3) $= \frac{32}{84}$ or/of $\frac{8}{21}$ or/of 0,38	✓ 32 ✓ answer/antwoord (2)
		[9]

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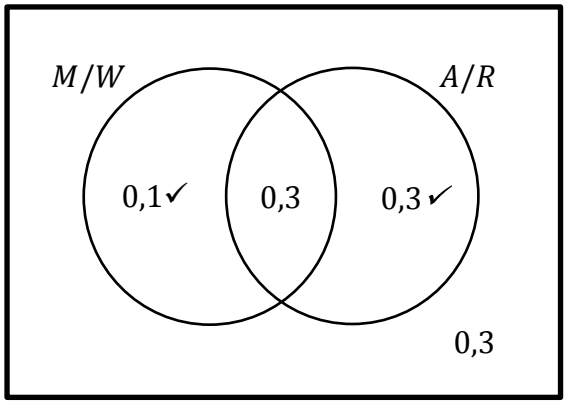
QUESTION 11/VRAAG 11

11.1	For independent events/vir onafhanklike gebeurtenisse: $P(M \text{ and/en } N) = P(M) \times P(N)$ $0{,}1 = P(M) \times 0{,}5$ $P(M) = \frac{0{,}1}{0{,}5}$ $= 0{,}2$ $x = 0{,}1$ $y = 0{,}4$	✓ rule/reëel ✓ substitution/substitusie ✓ 0,2 ✓ x-value/waarde ✓ y-value/waarde (5)
11.2.1	$P(\text{female failing/vroulik druip}) = \frac{16}{100}$	$\frac{16\checkmark}{100\checkmark}$ (2)
11.2.2	$P(\text{pass, given male/slag, gegee manlik}) = \frac{30}{37}$	$\frac{30\checkmark}{37\checkmark}$ (2)
11.3	$P(M \text{ or } A) = P(M) + P(A) - P(M \text{ and } A)$ $P(W \text{ of } R) = P(W) + P(R) - P(W \text{ en } R)$ $= 0{,}4 + 0{,}6 - 0{,}3$ $= 0{,}7$ $P(\text{fails both/druip albei}) = 0{,}3$ **OR/OF**  $P(\text{fails both/druip albei}) = 0{,}3$	✓ rule/reël ✓ 0,7 ✓ answer/antwoord Answer ONLY: 1 mark. SLEGS antwoord: 1 punt. ✓ 0,1 ✓ 0,3 ✓ answer/antwoord (3)
		[12]
		TOTAL/TOTAAL: 150

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