



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

JUNE/JUNIE 2019

**MATHEMATICS P1/WISKUNDE V1
MARKING GUIDELINE/NASIENRIGLYN**

MARKS/PUNTE: 150

This marking guideline consists of 14 pages./
Hierdie nasienriglyn bestaan uit 14 bladsye.

NOTE/LET WEL:

- 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(CA) applies in ALL aspects of the marking guideline.
Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyn van toepassing.
- 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	$x^2 + 7x = 0$ $x(x + 7) = 0$ $x = 0 \text{ or } x + 7 = 0$ $x = -7$	<p>✓ both factors / beide faktore</p> <p>✓ both x-values / beide x-waardes</p>	(2)
1.1.2	$5 - 10x - 3x^2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(-3)(5)}}{2(-3)}$ $x = \frac{10 \pm \sqrt{160}}{-6}$ $\therefore x = 0,44 \text{ or / of } x = -3,77$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Penalise 1 mark for incorrect rounding off./ <i>Penaliseer 1 punt vir verkeerde afronding.</i> </div> <p>✓ substitution / vervanging</p> <p>✓✓ x-values / waardes</p>	(3)
1.1.3	$(2x - 1)(4 - x) \geq 0$ $(2x - 1)(x - 4) \leq 0$ <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> </div> <div style="text-align: center;"> </div> </div> $\frac{1}{2} \leq x \leq 4$	<p>✓ critical values / kritieke waardes</p> <p>✓✓ answer (accuracy) / antwoord (akkuraatheid)</p>	(3)

<p>1.1.4</p>	$2\sqrt{x-3} = x-3$ $(2\sqrt{x-3})^2 = (x-3)^2$ $4(x-3) = x^2 - 6x + 9$ $0 = x^2 - 6x - 4x + 9 + 12$ $0 = x^2 - 10x + 21$ $0 = (x-3)(x-7)$ $\therefore x = 3 \text{ or } x = 7$	<ul style="list-style-type: none"> ✓ squaring both sides / <i>kwadreer beide kante</i> ✓ multiplication / <i>vermenigvuldiging</i> ✓ standard form / <i>standaardvorm</i> ✓ factors / <i>faktore</i> ✓ answers / <i>antwoorde</i> <p style="text-align: right;">(5)</p>
<p>1.2</p>	$y = -3x + 2 \dots\dots\dots(1)$ $x^2 + y = xy + x \dots\dots\dots(2)$ <p>(1) in (2):</p> $x^2 + (-3x + 2) = x(-3x + 2) + x$ $x^2 - 3x + 2 = -3x^2 + 2x + x$ $4x^2 - 6x + 2 = 0$ $2x^2 - 3x + 1 = 0$ $(2x-1)(x-1) = 0$ $x = \frac{1}{2} \text{ or / of } x = 1$ $y = \frac{1}{2} \text{ or / of } y = -1$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓ standard form / <i>standaardvorm</i> ✓ factors / <i>faktore</i> ✓ x-values / <i>waardes</i> ✓ y-values / <i>waardes</i> <p style="text-align: right;">(5)</p>
<p>1.3.1</p>	$x = \frac{3\sqrt{45} - 2\sqrt{80}}{\sqrt{125}}$ $x = \frac{3\sqrt{9 \times 5} - 2\sqrt{16 \times 5}}{\sqrt{25 \times 5}}$ $x = \frac{9\sqrt{5} - 8\sqrt{5}}{5\sqrt{5}}$ $x = \frac{1}{5}$	<ul style="list-style-type: none"> ✓ factors under root / <i>faktore onder wortel</i> ✓ simplification (this step must be seen) / <i>vereenvoudiging (hierdie stap moet gesien word)</i> ✓ answer / <i>antwoord</i> <p style="text-align: right;">(3)</p>

1.3.2	$a^2 = \frac{5}{b^3} \dots\dots(1)$ $\frac{a^5}{b^2} = 7 \dots\dots(2)$ <p>From (2): $b^2 = \frac{a^5}{7}$</p> $b = \left(\frac{a^5}{7}\right)^{\frac{1}{2}} \dots\dots(3)$ <p>(3) into (1): $a^2 \left[\left(\frac{a^5}{7}\right)^{\frac{1}{2}}\right]^3 = 5$</p> $a^2 \times \frac{a^{\frac{15}{2}}}{7^{\frac{3}{2}}} = 5$ $a^2 \times a^{\frac{15}{2}} = 5 \times 7^{\frac{3}{2}}$ $a^{\frac{19}{2}} = 5 \times 7^{\frac{3}{2}}$ $a = \left(5 \times 7^{\frac{3}{2}}\right)^{\frac{2}{19}}$ $a = \sqrt[19]{25 \times 343}$	<p>✓ equation (3) / <i>vergelyking (3)</i></p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ isolating <i>a</i> / <i>isolering van a</i></p> <p style="text-align: right;">(5)</p> <p style="text-align: right;">[26]</p>
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QUESTION 2/VRAAG 2

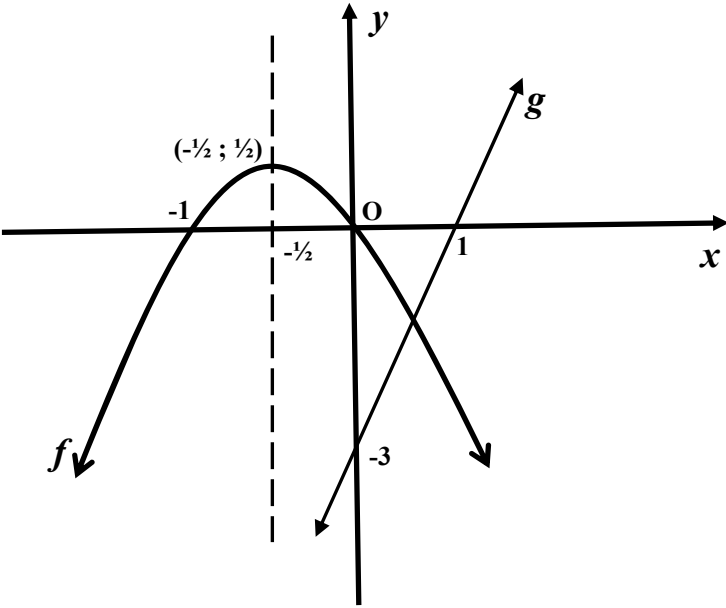

2.1.1	$12; 9; 6; \dots$ $a = 12$ and/en $d = -3$ $T_n = 12 + (n-1)(-3)$ $= -3n + 15$	$\checkmark d = -3$ \checkmark answer / <i>antwoord</i>	(2)
2.1.2	$T_n = -3(40) + 15$ $= -105$	\checkmark substitution / <i>vervanging</i> \checkmark answer / <i>antwoord</i>	(2)
2.1.3	$S_{40} = \frac{40}{2}(12 + (-105))$ $= -1860$	\checkmark substitution / <i>vervanging</i> \checkmark answer / <i>antwoord</i>	(2)
2.2.1	<i>Quadratic Pattern / Kwadratiese Patroon</i> : $T_1 = 10$ <i>1st difference pattern / 1^{ste} verskille patroon</i> : $-7; -5; -3; \dots$ $\therefore T_2 = 3$ and / en $T_3 = -2$	\checkmark first differences / <i>eerste verskille</i> $\checkmark \checkmark$ answers / <i>antwoorde</i> (T_1 and/en T_2)	(3)
2.2.2	$2a = 2$ $3a + b = -7$ $a + b + c = 10$ $a = 1$ $3(1) + b = -7$ $(1) + (-10) + c = 10$ $b = -10$ $c = 19$ $\therefore T_n = n^2 - 10n + 19$	\checkmark value of a / <i>waarde van a</i> \checkmark value of b / <i>waarde van b</i> \checkmark value of c / <i>waarde van c</i> $(\checkmark \checkmark \checkmark)$ can be awarded at formula / <i>kan by formule toegeken word</i>	(3)
2.2.3	$n^2 - 10n + 19 = 2019$ $n^2 - 10n - 2000 = 0$ $(n - 50)(n + 40) = 0$ $n = 50$ or / of $n = -40$ $\therefore T_{50} = 2019$	\checkmark equation / <i>vergelyking</i> \checkmark factors / <i>faktore</i> \checkmark answer / <i>antwoord</i> (T_{50})	(3)
2.3.1	$S_n = 81 - 81(3)^{-n}$ $T_1 = S_1 = 81 - 81(3)^{-1}$ $= 54$	\checkmark answer / <i>antwoord</i>	(1)

2.3.2	$T_2 = S_2 - S_1$ $= 72 - 54$ $= 18$ $r = \frac{T_2}{T_1} = \frac{18}{54} = \frac{1}{3}$ $T_n = a.r^{n-1}$ $= 54\left(\frac{1}{3}\right)^{n-1}$	<p>✓ $T_2 = 18$</p> <p>✓ $r = \frac{1}{3}$</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(3)</p>
2.3.3	<p>Yes/Ja.</p> $r = -1 < \frac{1}{3} < 1 \quad ; \quad r \neq 0$	<p>✓ YES / JA</p> <p>✓ reason / rede</p> <p style="text-align: right;">(2)</p>
2.3.4	$S_\infty = \frac{a}{1-r} \quad \text{or / of} \quad S_\infty = 81 - 81(3)^{-\infty}$ $= \frac{54}{1 - \frac{1}{3}}$ $= 81$ $= 81 - 81\left(\frac{1}{3}\right)^\infty$ $= 81$	<p>✓ substitution / vervanging</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
2.4	$\sum_{t=1}^3 (2x + 3t) + \sum_{r=7}^{12} (3(2)^{r-1}) = 0$ $(2x + 3 + 2x + 6 + 2x + 9) + \frac{192(2^6 - 1)}{2 - 1} = 0$ $6x + 18 + 12096 = 0$ $6x = -12114$ $x = -2019$	<p>✓ $(2x + 3 + 2x + 6 + 2x + 9)$</p> <p>✓ sum of GS / som van MR</p> <p>✓ simplification / vereenvoudiging</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(4)</p>
		[27]

QUESTION 3/VRAAG 3

3.1	$(\text{let / laat } y = 0) \quad / \quad (\text{let / laat } x = 0)$ $\frac{2}{x-1} + 1 = 0$ $\frac{2}{x-1} = -1$ $2 = -x + 1$ $x = -1$ $(-1; 0)$	$y = \frac{2}{0-1} + 1$ $y = -2 + 1$ $y = -1$ $(0; -1)$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ($y = 0$) ✓ substitution / <i>vervanging</i> ($x = 0$) ✓ coordinates of A / <i>koördinate van A</i> ✓ coordinates of B / <i>koördinate van B</i> 	(4)
3.2	$x = 1$		✓ answer / <i>antwoord</i>	(1)
3.3	$y \in \mathbb{R} \setminus \{1\}$ OR/OF $y \in \mathbb{R}$ but $y \neq 1$		✓ answer / <i>antwoord</i>	(1)
3.4	$A(-\sqrt{2} + 1; -\sqrt{2} + 1)$ and / en $B(\sqrt{2} + 1; \sqrt{2} + 1)$ $AB^2 = (\sqrt{2} + 1 + \sqrt{2} - 1)^2 + (\sqrt{2} + 1 + \sqrt{2} - 1)^2$ $= (2\sqrt{2})^2 + (2\sqrt{2})^2$ $= 16$ $\therefore AB = 4 \text{ units / eenhede}$		<ul style="list-style-type: none"> ✓ coordinates of A and B <i>koördinate van A en B</i> ✓ substitution / <i>vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i> 	(4)
3.5	$h(x) = -\frac{2}{(x-5)} + 1$		<ul style="list-style-type: none"> ✓ -ve (reflection / <i>refleksie</i>) ✓ $(x - 5)$ (shift / <i>skuif</i>) 	(2)
				[12]

QUESTION 4/VRAAG 4

4.1		<p>Parabola / Parabool</p> <ul style="list-style-type: none"> ✓ x-intercepts / x-afsnitte ✓ Turning point / Draaipunt ✓ Axis of symmetry / Simmetrie-as ✓ Shape / Vorm <p>Straight line / Reguitlyn</p> <ul style="list-style-type: none"> ✓ x-intercept / x-afsnit ✓ y-intercept / y-afsnit
4.2	<p>From sketch / Vanaf skets $-1 < x < 0$ or / of $x \in (-1; 0)$ Algebraic solution / Algebraïese oplossing</p> $-2x^2 - 2x > 0$ $-2x(x+1) > 0$ $2x(x+1) < 0$ <p>cv / kw: $-1 < x < 0$</p> 	<p>✓✓ answer / antwoord</p>
4.3	$ST = -2x^2 - 2x - (3x - 3)$ $= -2x^2 - 5x + 3$ $ST'(x) = -4x - 5 = 0$ $-4x = 5$ $x = -\frac{5}{4}$ $\text{Max / Maks} = -2\left(-\frac{5}{4}\right)^2 - 5\left(-\frac{5}{4}\right) + 3$ $= \frac{49}{8} / \left(6\frac{1}{8}\right)$	<ul style="list-style-type: none"> ✓ $ST = -2x^2 - 2x - (3x - 3)$ ✓ $ST' = 0$ ✓ $x = -\frac{5}{4}$ <p>✓ answer / antwoord</p>
		(4)
		[12]

QUESTION 5/VRAAG 5

5.1	$f(x) = 2^x$ $k = 2^{-3}$ $k = \frac{1}{8}$	✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> (2)
5.2	$f^{-1}(x): x = 2^y$ $y = \log_2 x$ $g^{-1}(x): x = 2y + 1$ $x - 1 = 2y$ $y = \frac{1}{2}x - \frac{1}{2}$	✓ interchanging x and y <i>omruil van x en y</i> ✓ answer / <i>antwoord</i> ✓ interchanging x and y <i>omruil van x en y</i> ✓ answer / <i>antwoord</i> (4)
5.3	$f'(x).g(x) \leq 0$ $f'(x)$ is always +ve $g(x)$ is -ve for $x < -\frac{1}{2}$ +ve for $x > -\frac{1}{2}$ $\therefore x \leq -\frac{1}{2}$	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i> (2)
		[8]

QUESTION 6/VRAAG 6

6.1	$A = P(1+i)^n$ $= 150\,000 \left(1 + \frac{6,5}{100}\right)^5$ $= R\,205\,513,00$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> <p style="text-align: right;">(2)</p>
6.2	$A = P(1-i)^n$ $134\,000 = 975\,000(1-i)^7$ $(1-i)^7 = \frac{134}{975}$ $1-i = \sqrt[7]{\frac{134}{975}}$ $-i = -0,2468673864$ $\therefore \text{rate / koers} = 24,69\%$	<ul style="list-style-type: none"> ✓ substitution / <i>vervanging</i> ✓ simplification / <i>vereenvoudiging</i> ✓ answer / <i>antwoord</i> <p style="text-align: right;">(3)</p>
6.3.1	$1+i_{\text{eff}} = \left(1 + \frac{i_{\text{nom}}}{n}\right)^n$ $i_{\text{eff}} = \left(1 + \frac{6,5\%}{12}\right)^{12} - 1$ $i_{\text{eff}} = 0,066971852$ $\therefore \text{effective rate / effektiewe koers} = 6,70\% \text{ p.a.}$	<ul style="list-style-type: none"> ✓ formula / <i>formule</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i> <p style="text-align: right;">(3)</p>
6.3.2	$x \left(1 + \frac{6,5}{1200}\right)^{60} \left[1 + \frac{7,5}{400}\right]^{20} = 2\,000\,000$ $x = \frac{2\,000\,000}{\left(1 + \frac{6,5}{1200}\right)^{60} \left[1 + \frac{7,5}{400}\right]^{20}}$ $x = R\,997\,500,00$	<ul style="list-style-type: none"> ✓ $\left(1 + \frac{6,5}{1200}\right)^{60}$ ✓ $\left[1 + \frac{7,5}{400}\right]^{20}$ ✓ equation / <i>vergelyking</i> (= 2 000 000) ✓ making <i>x</i> subject of the formula / <i>maak x die onderwerp van die formule</i> ✓ answer / <i>antwoord</i> <p style="text-align: right;">(5)</p>
		[13]

QUESTION 7/VRAAG 7

Penalise 1 mark for incorrect notation in the question
 Penaliseer 1 punt vir verkeerde notasie in die vraag

7.1	$f(x) = 5x^2 - 5x$ $f(x + h) = 5(x + h)^2 - 5(x + h)$ $= 5(x^2 + 2xh + h^2) - 5x - 5h$ $= 5x^2 + 10xh + 5h^2 - 5x - 5h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{5x^2 + 10xh + 5h^2 - 5x - 5h - 5x^2 + 5x}{h}$ $= \lim_{h \rightarrow 0} \frac{10xh - 5h^2 - 5h}{h}$ $= \lim_{h \rightarrow 0} \frac{h(10x + 5h - 5)}{h}$ $= \lim_{h \rightarrow 0} (10x + 5h - 5)$ $= 10x - 5$	<p>✓ $5x^2 + 10xh + 5h^2 - 5x - 5h$</p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ simplification / <i>vereenvoudiging</i></p> <p>✓ common factor / <i>gemene faktor</i></p> <p>✓ answer / <i>antwoord</i></p>
<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;"> Answer ONLY: 0 marks SLEGS antwoord: 0 punte </div>		
7.2	$y = \frac{\sqrt{x}}{2} - \frac{1}{x^3}$ $y = \frac{1}{2}x^{\frac{1}{2}} - x^{-3}$ $\therefore \frac{dy}{dx} = \frac{1}{4}x^{-\frac{1}{2}} + 3x^{-4}$	<p>✓ $y = \frac{1}{2}x^{\frac{1}{2}} - x^{-3}$</p> <p>✓ $\frac{1}{4}x^{-\frac{1}{2}}$ ✓ $3x^{-4}$</p>
7.3	$f(-1) = (-1)^3 = -1$ $f(1) = (1)^3 = 1$ $\bar{m} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$ $= \frac{1 - (-1)}{1 - (-1)}$ $= \frac{2}{2} / 1$	<p>✓ $f(-1)$ and / en $f(1)$</p> <p>✓ substitution / <i>vervanging</i></p> <p>✓ answer / <i>antwoord</i></p>
(3)		
[11]		

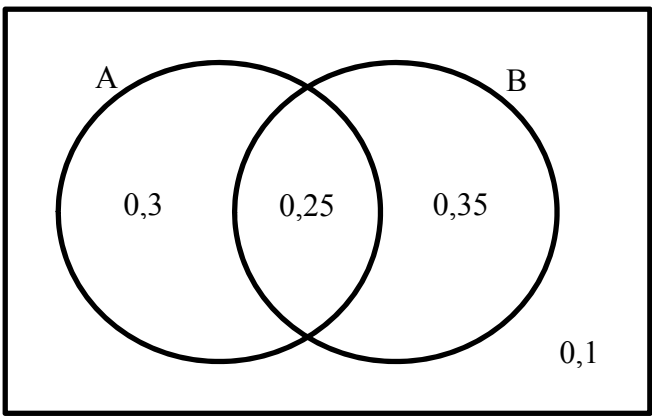
QUESTION 8/VRAAG 8

8.1.1	$f(x) = -(2x - 5)(x + 2)^2 = 0$ $-2x + 5 = 0$ or / of $x + 2 = 0$ $\therefore x = \frac{5}{2}$ or / of $x = -2$ $AB = 4,5 \text{ units / eenhede}$	✓ x -intercepts / x -afsnitte ✓ answer / antwoord (2)
8.1.2	$f(x) = -2x^3 - 3x^2 + 12x + 20$ $f'(x) = -6x^2 - 6x + 12 = 0$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1) = 0$ $x + 2 = 0$ or / of $x - 1 = 0$ $x = -2$ or / of $x = 1$ $T(1 ; y)$	✓ $f'(x)$ ✓ factors / faktore ✓ correct x -value for T / korrekte x -waarde vir T (3)
8.1.3	$m_p = -6(-3)^2 - 6(-3) + 12$ $= -24$ $y - y_1 = m(x - x_1)$ $y - 11 = -24(x + 3)$ $y = -24x - 61$	✓ gradient / gradiënt ✓ substitution / vervanging ✓ answer / antwoord (3)
8.1.4	$T(1 ; y)$ $y = -2(1)^3 - 3(1)^2 + 12(1) + 20$ $= 27$ $\therefore 0 < k < 27$	✓ max. value / maks. waarde ✓✓ answer / antwoord (accuracy/akkuraatheid) (3)
8.2.1	$c'(x) = -\frac{3}{2}x^2 + 6x = 0$ $x(-\frac{3}{2}x + 6) = 0$ $x = 0$ or / of $x = 4$ $\therefore 0 < x < 4$	✓ equating to 0 / gelykstel aan 0 ✓ factors / faktore ✓ answer / antwoord (accuracy/akkuraatheid) (3)
8.2.2	$c''(x) = -3x + 6 = 0$ or / of $x = \frac{0 + 4}{2}$ $x = 2$ $x = 2$ $\therefore c(x)$ is concave up for $x < 2$ / $c(x)$ is konkaaf opwaarts vir $x < 2$ $c(x)$ is concave down for $x > 2$ / $c(x)$ is konkaaf afwaarts vir $x > 2$	✓ method / metode ✓ x -value / x -waarde ✓✓ conclusion/gevolgtrekking (4)
		[18]

QUESTION 9/VRAAG 9

9.1	$h = \frac{12 - 4x}{3}$	✓✓ answer / antwoord (2)
9.2	$\begin{aligned} \text{Area} &= l \times b \\ &= x \left(\frac{12 - 4x}{3} \right) \\ &= 4x - \frac{4x^2}{3} \\ \\ A'(x) &= 4 - \frac{8}{3}x = 0 \\ -\frac{8}{3}x &= -4 \\ x &= 1,5 \text{ m} \\ h &= \frac{12 - 4(1,5)}{3} = 2 \text{ m} \end{aligned}$	✓ substitution / vervanging ✓ answer / antwoord ✓ derivative / afgeleide ✓ $f'(x) = 0$ ✓ answer / antwoord ✓ answer / antwoord (6)
		[8]

QUESTION 10/VRAAG 10

<p>10.1.1</p>	<p style="text-align: right;">$P(S) = 1$</p> 	<p>✓ 0,3 & 0,25 ✓ 0,35 & 0,25 ✓ 0,1</p> <p style="text-align: right;">(3)</p>
<p>10.1.2</p>	<p>$P(A \text{ or/of } B) = P(A) + P(B) - P(A \text{ and/en } B)$ $= 0,55 + 0,6 - 0,25$ $= 0,9$ <i>or / of (from sketch / vanaf skets)</i> $P(A \text{ or/of } B) = 0,3 + 0,25 + 0,35$ $= 0,9$</p>	<p>✓ method / metode ✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
<p>10.1.3</p>	<p>$P(A \text{ and/en } B') = 0,3$</p>	<p>✓✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
<p>10.1.4</p>	<p>No/Nee : $P(A \cap B) = 0,25 \neq 0$</p>	<p>✓ answer / antwoord</p> <p style="text-align: right;">(1)</p>
<p>10.1.5</p>	<p>$P(A \cup B)' = 0,1 \neq 0$ No/Nee : <i>or / of</i> $P(A \cup B) = 0,9 \neq 1$</p>	<p>✓ answer / antwoord</p> <p style="text-align: right;">(1)</p>
<p>10.2.1</p>	<p>$a = 20$ $b = (40 - x)$</p>	<p>✓ $a = 20$ ✓ $b = (40 - x)$</p> <p style="text-align: right;">(2)</p>
<p>10.2.2</p>	<p>$79 - x + 20 + 19 - x + x + 11 + 16 + 40 - x = 173$ $-2x = 173 - 185$ $-2x = -12$ $x = 6$</p>	<p>✓ equation / vergelyking ✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
<p>10.2.3</p>	<p>$P(\text{at least 2 / ten minste 2})$ $= \frac{20 + 11 + 16 + 6}{173}$ $= \frac{53}{173} / 0,31 / 30,6\%$</p>	<p>✓ adding correct values / tel korrekte waardes op ✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>
<p style="text-align: right;">[15]</p>		
<p style="text-align: right;">TOTAL/TOTAAL: 150</p>		

