



# basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT

GRADE/GRAAD 10

MATHEMATICS P1/WISKUNDE V1

NOVEMBER 2018

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 100

These marking guidelines consist of 11 pages.  
*Hierdie nasienriglyne bestaan uit 11 bladsye.*

Approved  
*C. Oudel*  
11/11/2018

DEPARTMENT OF BASIC  
EDUCATION  
PRIVATE BAG X895, PRETORIA 0001

2018 -11- 12

APPROVED MARKING GUIDELINE  
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**NOTE:**

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

**LET WEL:**

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

QUESTION/VRAAG 1				
1.1.1	$4x - x^3$ $= x(4 - x^2)$ $= x(2 - x)(2 + x)$	<b>OR/OF</b>	$4x - x^3$ $= -x(x^2 - 4)$ $= -x(x - 2)(x + 2)$	✓ common factor/gemeenskaplike faktor ✓ difference of two squares/verskil van twee kwadrate (2)
1.1.2	$x^2 + 15x - 54$ $= (x + 18)(x - 3)$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">                     If correct factors, incorrect signs : 1/2 marks                 </div>		✓✓ factors/faktore (2)
1.1.3	$y - xy + x - 1$ $= y(1 - x) - 1(1 - x)$ $= (y - 1)(1 - x)$	<b>OR/OF</b>	$y - xy + x - 1$ $= y - 1 - x(y - 1)$ $= (y - 1)(1 - x)$	✓ first common factor or group (y - 1) ✓ second common factor ✓ answer (3)
1.2.1	$(x + 2)(x^2 - x + 3)$ $= x^3 - x^2 + 3x + 2x^2 - 2x + 6$ $= x^3 + x^2 + x + 6$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">                     Answer only : 2/2 marks                 </div>		✓ simplification/vereenvoudiging ✓ answer/antwoord (2)
1.2.2	$\frac{5}{x+3} - \frac{3}{2-x}$ $= \frac{5(2-x) - 3(x+3)}{(x+3)(2-x)}$ $= \frac{10 - 5x - 3x - 9}{(x+3)(2-x)}$ $= \frac{1 - 8x}{(x+3)(2-x)}$ <p><b>OR</b></p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;">                             DEPARTMENT OF BASIC EDUCATION                              PRIVATE BAG X895, PRETORIA 0001                              2018 -11- 12                              APPROVED MARKING GUIDELINE                              PUBLIC EXAMINATION                         </p> </div>		✓ (x + 3)(2 - x) ✓ 5(2 - x) - 3(x + 3) ✓ answer/antwoord (3)

	$\frac{5}{x+3} - \frac{3}{2-x}$ $= \frac{5}{(x+3)} + \frac{3}{(x-2)}$ $= \frac{5(x-2) + 3(x+3)}{(x+3)(x-2)}$ $= \frac{5x-10+3x+9}{(x+3)(x-2)}$ $= \frac{8x-1}{(x+3)(x-2)}$	<p>✓ <math>(x+3)(x-2)</math>  ✓ <math>5(x-2) + 3(x+3)</math></p> <p>✓ answer/antwoord (3)</p>
1.2.3	$\frac{25^{-x} \cdot 15^{x+1}}{3^x \cdot 5^{-x}}$ $= \frac{5^{-2x} \cdot 3^{x+1} \cdot 5^{x+1}}{3^x \cdot 5^{-x}}$ $= 5^{-2x+x+1+x} \cdot 3^{x+1-x}$ $= 5^1 \cdot 3^1$ $= 15$	<p>✓ <math>5^{-2x}</math>  ✓ <math>3^{x+1} \cdot 5^{x+1}</math></p> <p>✓ answer/antwoord (3)</p>
1.3	$(3p+q)^2$ $= 9p^2 + 6pq + q^2$ $= 9p^2 + q^2 + 6pq$ $= 12 + 6(-3)$ $= -6$	<p>✓ expansion/ ontwikkeling</p> <p>✓ subst./verv.</p> <p>✓ answer/antwoord (3)</p>
		<b>[18]</b>

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QUESTION/VRAAG 2			
2.1.1	$px + qx = a$ $x(p + q) = a$ $x = \frac{a}{p + q} ; p \neq -q$	<div style="border: 1px solid black; padding: 5px; display: inline-block;">No restriction: 2/2 marks</div> ✓ common factor/gemeenskaplike faktor ✓ answer/antwoord (2)	
2.1.2	$2x^2 - 5x + 2 = 0$ $(2x - 1)(x - 2) = 0$ $x = \frac{1}{2}$ or $x = 2$	✓ factors/faktore ✓✓ ca answer from factors/va antwoord van faktors (3)	
2.1.3	$\left(\frac{1}{2}\right)^{3x+1} = 32$ $2^{-3x-1} = 2^5$ $-3x - 1 = 5$ $3x = -6$ $x = -2$	$\left(\frac{1}{2}\right)^{3x+1} = 32$ $\left(\frac{1}{2}\right)^{3x+1} = \left(\frac{1}{2}\right)^{-5}$ $3x + 1 = -5$ $3x = -6$ $x = -2$	✓ $2^{-3x-1} = 2^5$ or $\left(\frac{1}{2}\right)^{3x+1} = \left(\frac{1}{2}\right)^{-5}$ ✓ equating exponents/gelykstelling van eksponente ✓ answer/antwoord (3)
2.2.1	$-11 \leq 3m - 8 < 4$ $-3 \leq 3m < 12$ $-1 \leq m < 4$	$-3 \leq 3m < 12$ ✓ answer/antwoord (2)	
2.2.2	5 integers/heelgetalle	✓ answer/antwoord (1)	
2.3	$5x + 4y = 21 \dots\dots\dots(1)$ $2x = 3 - y \dots\dots\dots(2)$ $y = 3 - 2x \dots\dots\dots(3)$ sub (3) into (1) $5x + 4(3 - 2x) = 21$ $5x - 8x = 21 - 12$ $-3x = 9$ $x = -3$ $y = 3 - 2(-3)$ $y = 9$ OR/OF	$y = 3 - 2x$ ✓ subst./verv. ✓ x value/x-waarde ✓ y value/y-waarde (4) OR/OF	

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<p> <math>5x + 4y = 21</math> .....(1)  <math>2x = 3 - y</math>.....(2)  <math>x = \frac{3-y}{2}</math> .....(3)                      sub (3) into (1)  <math>5\left(\frac{3-y}{2}\right) + 4y = 21</math>  <math>5(3-y) + 8y = 42</math>  <math>3y = 27</math>  <math>y = 9</math>  <math>x = -3</math>   <b>OR/OF</b>  <math>5x + 4y = 21</math>.....(1) <math>\times 1</math>  <math>2x + y = 3</math>.....(2) <math>\times 4</math>  <math>5x + 4y = 21</math>.....(1)  <math>8x + 4y = 12</math>.....(3)  <math>(3) - (1) : 3x = -9</math>  <math>x = -3</math>                      Sub from (2)  <math>y = 3 - 2(-3)</math>  <math>y = 9</math> </p>	<p> <math>\checkmark x = \frac{3-y}{2}</math>   <math>\checkmark</math> subst./verv.   <math>\checkmark</math> y value/y-waarde  <math>\checkmark</math> x value/x-waarde (4)   <b>OR/OF</b>   <math>\checkmark 8x + 4y = 12</math>   <math>\checkmark</math> method  <math>\checkmark</math> x value/x-waarde   <math>\checkmark</math> y value/y-waarde (4)                 </p>
	<p>[15]</p>

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QUESTION/VRAAG 3		
3.1	$T_4 = 11$	✓ answer/antwoord (1)
3.2	$T_n = pn + q$ $= -3n + q$ $14 = -3(3) + q$ $q = 23$ $T_n = -3n + 23$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Answer only: 2/2 marks</div> ✓ common difference = -3 ✓ answer (2)
3.3	$T_n = -3n + 23$ $-3n + 23 = -103$ $3n = 126$ $n = 42$	✓ equating to -103/ gelykstelling aan -103 ✓ answer/antwoord (2)
3.4	$T_n < 0$ $-3n + 23 < 0$ $-3n < -23$ $n > \frac{23}{3}$ (7,666...) $\therefore n = 8$  <b>OR/OF</b> 20 ; 17 ; 14 ; 11 ; 8 ; 5 ; 2 ; -1 n = 8 terms	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Answer only: 1/3 marks</div> ✓ $T_n < 0$  ✓ simplification/ vereenvoudiging ✓ correct conclusion, i.e n = 8/korrekte afleiding, m.a.w. n = 8 (3)  ✓✓ expansion ✓ answer (3)
3.5	$T_n = -3n + 23$ $T_{37} = -3(37) + 23$ $T_{37} = -88$  <b>OR/OF</b> $T_n = -6n + 26$ $T_{19} = -6(19) + 26$ $T_{19} = -88$  <b>OR/OF</b> 20 ; 17 ; 14 ; 11 ; 8 ; 5 ; 2 ; -1 ; -4 ; -7 ; -10 ; -13 ; -16 ; -19 ; -22 ; -25 ; -28 ; -31 ; -34 ; -37 ; -40 ; -43 ; -46 ; -49 ; -52 ; -55 ; -58 ; -61 ; -64 ; -67 ; -70 ; -73 ; -76 ; -79 ; -82 ; -85 ; -88 Answer = -88	<div style="text-align: center;"> <small>EDUCATION</small>  <small>PRIVATE BAG X885, PRETORIA 0001</small>  <b>2018 -11- 12</b>  <small>APPROVED MARKING GUIDELINE</small>  <small>PUBLIC EXAMINATION</small> </div> ✓ $-3(37) + 23$ ✓ answer/antwoord (2)  ✓ $-6(19) + 26$ ✓ answer/antwoord (2)  ✓ expansion ✓ answer (2)

QUESTION/VRAAG 4		
4.1.1	$4^2 = 16$	✓ answer/antwoord (1)
4.1.2	$13^2 = 169$	✓ answer/antwoord (1)
4.1.3	$T_n = n^2$	✓ answer/antwoord (1)
4.2	$T_n = 2n - 1$ $43 = 2n - 1$ $44 = 2n$ $n = 22$ Total dots = $n^2 = 22^2$ $= 484$  <b>OR/OF</b>  $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 + 25 + 27 + 29 + 31 + 33 + 35 + 37 + 39 + 41 + 43$ $= 484$	✓ $T_n = 2n - 1$  ✓ $n = 22$  ✓ answer/antwoord (3)  ✓✓ correct expansion  ✓ answer (3)
		[6]

QUESTION/VRAAG 5		
5.1.1	D(0 ; -3)	✓ x value/x-waarde ✓ y value/y-waarde (2)
5.1.2	$y > -4$ <b>OR/OF</b> $y \in (-4 ; \infty)$	✓ answer/antwoord (1)
5.2.1	$0 = \left(\frac{1}{2}\right)^x - 4$ $2^{-x} = 4$ $2^{-x} = 2^2$ $x = -2$ A(-2 ; 0)	✓ equating g to 0/ gelykstelling aan 0  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">                         Answer only of A(-2 ; 0):                          2/2 marks                     </div>  ✓ answer as a coordinate/antwoord as 'n koordinaat (2)

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<p>5.2.2</p>	$f(x) = ax^2 + q$ $3 = a(1)^2 + q \quad \text{at } E(1 ; 3)$ $3 = a + q \dots\dots\dots(1)$ $0 = a(-2)^2 + q \quad \text{at } A(-2 ; 0) \text{ or } B(2 ; 0)$ $0 = 4a + q$ $q = -4a \dots\dots\dots(2)$ $a = -1$ $q = 4$ <p><b>OR/OF</b></p> $y = a(x-2)(x+2)$ $3 = a(1-2)(1+2)$ $3 = -3a$ $a = -1$ $y = -(x^2 - 4)$ $y = -x^2 + 4$ $q = 4$	<p>✓ subst. (1 ; 3)/ verv. (1 ; 3)</p> <p>✓ subst. coordinates of A or B/verv. die coordinate van A of B</p> <p>✓ a value/a-waarde ✓ q value/q-waarde (4)</p> <p>✓ <math>y = a(x-2)(x+2)</math> ✓ subst of (1 ; 3)</p> <p>✓ a value</p> <p>✓ q value (4)</p>
<p>5.3.1</p>	<p>C(0 ; 4) D(0 ; -3) CD = <math>y_C - y_D</math> = <math>4 - (-3)</math> = 7 units/eenhede</p> <p><b>OR/OF</b></p> $CD = \sqrt{(0-0)^2 + (4-(-3))^2}$ $= \sqrt{49}$ $= 7$	<p>Answer only: 2/2 marks</p> <p>✓ C(0 ; 4) (indicated or implied)</p> <p>✓ answer/antwoord (2)</p> <p>✓ C(0 ; 4) (indicated or implied)</p> <p>✓ answer/antwoord (2)</p>
<p>5.3.2</p>	$m = \frac{0 - (-3)}{-2 - (0)}$ $m = -\frac{3}{2}$ $y = -\frac{3}{2}x - 3$	<p>✓ subst. into gradient/verv.</p> <p>✓ m value/m-waarde</p> <p>✓ equation/ vergelyking (3)</p>
<p>5.4.1</p>	<p><math>-2 &lt; x &lt; 2</math> OR <math>x \in (-2 ; 2)</math></p>	<p>✓ critical values/ kritieke waardes ✓ notation/notasie (2)</p>
<p>5.4.2</p>	<p><math>x &gt; 0</math> OR <math>x \in (0 ; \infty)</math></p>	<p>✓ answer/antwoord (1)</p>

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QUESTION/VRAAG 6		
6.1.1	$g(x) = \frac{a}{x} + q$ $2 = \frac{a}{3} + 1$ $a = 3$ $\therefore g(x) = \frac{3}{x} + 1$	✓ $q = 1$ ✓ subst. of (3 ; 2)/verv. van (3 ; 2) ✓ $a$ value (3)
6.1.2	$h(x) = x + 1$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 10px;">Answer only: 2/2 marks</div>	✓ $m = 1$ ✓ answer/antwoord (2)
6.2		g: ✓ shape of g ✓ horizontal asymptote (ca from 6.1.1) ✓ x-intercept  h: ✓ x and y-intercept (4)
6.3	$f(x) = -\left(\frac{3}{x} + 1\right) + 5$ $f(x) = -\frac{3}{x} + 4$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 10px;">Answer only: 3/3 marks</div> <p>The equations of the asymptotes are:  <math>x = 0</math>  <math>y = 4</math></p>	✓ equation of $f$ / vergelyking van $f$  ✓ $x = 0$ ✓ $y = 4$ (3)
<b>[12]</b>		

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<b>QUESTION/VRAAG 7</b>		
7.1	Total amount paid / <i>Totale bedrag betaal</i> $= R 229 \times 24$ $= R 5 496$	✓ answer/antwoord (1)
7.2	$A = P(1 + i.n)$ $5 496 = P(1 + 0,075 \times 2)$ $P = R 4 779,13$	✓ $n = 2$ ✓ correct subst. into correct formula/ <i>verv.</i> (2)
7.3	Interest/ <i>Rente</i> $= R 5 496 - R 4 779,13$ $= R 716,87$	✓ answer/antwoord (1)
7.4	Insurance/ <i>Versekering</i> $= \frac{R 4779,13 \times 0,115}{12}$ $= R 45,80$  New monthly payments/ <i>Nuwe maandelikse paaieiment</i> $= R 45,80 + R 229$ $= R 274,80$  <b>OR/OF</b> Total insurance $= 4779,13 \times 0,115 \times 2$ $= R 1 099,20$  Total cost $= 5 496 + 1 099,20$ $= R 6 595,20$  Total monthly payment $= \frac{6 595,20}{24}$ $= R 274,80$  <b>OR/OF</b> Total insurance $= 4779,13 \times 0,115 \times 2$ $= R 1 099,20$  Total insurance per month $= \frac{1 099,20}{24}$ $= 45,80$  Total monthly payment $= R 229 + R 45,80$ $= R 274,80$	✓ $4779,13 \times 0,115$ ✓ dividing by 12/ <i>deling deur 12</i>  ✓ answer/antwoord (3)  ✓ $4779,13 \times 0,115 \times 2$  ✓ total cost  ✓ answer (3)  ✓ $4779,13 \times 0,115 \times 2$  ✓ insurance per month  ✓ answer (3)

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7.5	$A = P(1+i)^n$ $5100 = 4779,13(1+i)^2$ $i = \sqrt{1,067139835} - 1$ $i = 0,03302460526$ <p>Inflation rate/<i>Inflasiekoers</i> = 3,30%</p>	✓ formula/ <i>formule</i> ✓ correct subst. of A and P/ <i>verv.</i> ✓ simplification/ <i>vereenvoudiging</i> ✓ answer/ <i>antwoord</i> (4) [11]
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<b>QUESTION/VRAAG 8</b>		
8.1.1 (a)	$P(B) = 1 - P(B')$ $= 1 - \frac{3}{8}$ $= \frac{5}{8}$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin: 10px auto;">Answer only: 2/2 marks</div>	✓ formula ✓ answer/ <i>antwoord</i> (2)
8.1.1(b)	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $\frac{5}{7} = \frac{2}{5} + \frac{5}{8} - P(A \text{ and } B)$ $P(A \text{ and } B) = \frac{87}{280}$ $= 0,31$	✓ identity ✓ subst./ <i>verv.</i> ✓ answer/ <i>antwoord</i> (3)
8.1.2	Not mutually exclusive events. $P(A \text{ and } B) \neq 0$	✓ NOT/ <i>NIE</i> ✓ reason/ <i>rede</i> (2)
8.2.1	$P(A \cap B)$ <b>OR/OF</b> $P(A \text{ and } B)$	✓ answer/ <i>antwoord</i> (1) ✓ answer/ <i>antwoord</i> (1)
8.2.2	$P(A \cup B)'$ <b>OR/OF</b> $P(A \text{ or } B)'$ <b>OR/OF</b> $1 - P(A \text{ or } B)$	✓ answer/ <i>antwoord</i> (1) ✓ answer/ <i>antwoord</i> (1) ✓ answer/ <i>antwoord</i> (1)
8.2.3	$P(A \text{ or } B) - P(A \text{ and } B)$ <b>OR/OF</b> $P(\text{only } A) + P(\text{only } B)$	✓ answer/ <i>antwoord</i> (1) ✓ answer/ <i>antwoord</i> (1)
8.3	(8.2.3) <u>None of them</u> → In all 3 instances, with the shading removed, one sees two events that "overlap" ∴ not mutually exclusive	✓ answer/ <i>antwoord</i> (1) [11]
<b>TOTAL/TOTAAL</b>		<b>[100]</b>

**GRADE 10 MATHEMATICS  
NOVEMBER 2018 : PAPER 1  
ADDENDUM TO THE MARKING GUIDELINES**

These notes have been created to provide options that learners may use and the appropriate mark allocation for their answers.

1.2.3	The mark for $5^{-2x}$ is NOT for $(5^2)^{-x}$	
1.3	$(3p+q)^2$ $=9p^2+q^2$ $=9p^2+q^2$ $=12$	Award : 1/3 marks
2.2.2	If the candidate list the integers: -1 ; 0 ; 1 ; 2 ; 3	Award : 1/1 marks
3.2	$T_n = a + (n-1)d$ $= 20 + (n-1)(-3)$ $= -3n + 23$	✓ common difference = -3 ✓ answer (2)
3.3	ca the answer – provided the $n$ does not work out to be negative or a fraction.	
3.4	If $T_n = -1$ $-3n + 23 = -1$ $-3n = -24$ $n = 8$	Award max: 2/3 marks
3.5	$T_{19} = -3(19) + 23$ $= -34$	Award: 0/2 marks
5.1.1	Accept: $x = 0$ $y = -3$	
5.2.1	A must be in coordinate form.	
6.1.2	If the candidate leaves the answer as: $h(x) = x + q$	Award: 2 / 2 marks
6.2	The shape mark for $g$ is for 2 arms being in the correct positions	
7.5	<ul style="list-style-type: none"> <li>• If <math>n = 24</math>; <math>i = 27,11\%</math>: award 3 / 4 marks</li> <li>• If A and P are swapped, max: 1 / 4 marks (answer is <math>-3,19\%</math>)</li> <li>•</li> </ul>	
8.1.2	If a candidate answers NOT mutually exclusive with NO reason: award 1 / 2 marks	

8.2	Candidates may use the values from question 8.1. If they do, these are the answers and the subsequent mark allocations:	
8.2.1	$P(A \text{ and } B)$ $= \frac{87}{280}$	✓ answer
8.2.2	$P(A \text{ or } B)'$ $= \frac{2}{7}$	✓ answer
8.2.3	$P(A \text{ or } B) - P(A \text{ and } B)$ $= \frac{5}{7} - \frac{87}{280}$ $= \frac{113}{280}$	✓ answer

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