



**GAUTENG PROVINCE**  
EDUCATION  
REPUBLIC OF SOUTH AFRICA

# PROVINSIALE EKSAMEN

JUNIE 2023

GRAAD 11

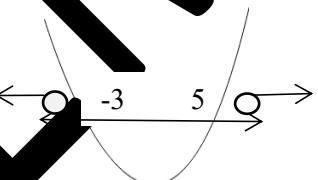
NASIENKRIGELINE

WISKUNDE (VRAAGSTEL 1)

10 bladsye

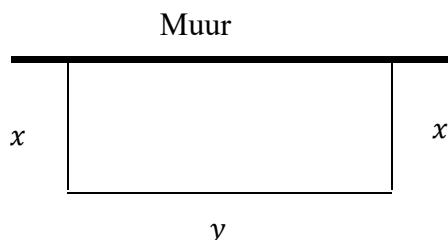
**EXEMPLAR**

## VRAAG 1

1.1	1.1.1	$x \in \{4 ; 5\}$	✓ antwoord ✓ antwoord	(2)
	1.1.2	$x \in \{0 ; 3\}$	✓ antwoord ✓ antwoord	(2)
	1.1.3	$x \in \{1 ; 2\}$	✓ antwoord ✓ antwoord	(2)
1.2	1.2.1	$3x^2 - 4x = 0$ $\therefore x(3x - 4) = 0$ $x = 0 \dots \text{of} \dots x = \frac{4}{3}$ <p><b>NOTA:</b> Enige ander geldige metode.</p>	✓ faktore ✓ antwoorde	(3)
	1.2.2	$3x - 14 = -6x^2$ $\therefore 6x^2 + 3x - 14 = 0$ $\therefore x = \frac{-(3) \pm \sqrt{(3)^2 - 4(6)(-14)}}{2(6)}$ $\therefore x = 1,29 \text{ of } x = -3,29$	✓ standaard vorm ✓ substitusie ✓✓ antwoorde	(4)
	1.2.3	$(x+1)(x-5) > 12$ $x^2 - 2x - 5 > 12$ $x^2 - 2x - 17 > 0$ $(x-5)(x+3) > 0$ $\therefore x > 5 \dots \text{of} \dots x < -3$ 	✓ standaard vorm ✓ faktore ✓✓ antwoorde	(4)
	1.2.4	$\sqrt{2-x} + 2 =$ $\sqrt{2-x} = x-2$ $(\sqrt{2-x})^2 = (x-2)^2$ $2-x = x^2 - 4x + 4$ $0 = x^2 - 3x + 2$ $0 = (x-2)(x-1)$ $\therefore x = 2 \dots \text{of} \dots x = 1(\text{NA})$	✓ kwadreer beide kante ✓ standaard vorm ✓ faktore ✓✓ antwoorde met keuse	(4)

	1.2.5	$\begin{aligned} x - 6 &= 0 \\ \therefore x &= 6 \\ \therefore x &= 2y + 3 \\ 6 &= 2y + 3 \\ 2y &= 3 \\ \therefore y &= \frac{3}{2} \end{aligned}$	<ul style="list-style-type: none"> <li>✓ waarde van <math>x</math></li> <li>✓ substitusie</li> <li>✓ waarde van <math>y</math></li> </ul>	(3)
	1.3	$\begin{aligned} y - 1 &= 2x \\ \therefore y &= 2x + 1 \dots\dots\dots(1) \\ x^2 + xy - 3x - y + 2 &= 0 \dots\dots\dots(2) \\ \therefore x^2 + x(2x + 1) - 3x - (2x + 1) + 2 &= 0 \\ x^2 + 2x^2 + x - 3x - 2x - 1 + 2 &= 0 \\ \therefore 3x^2 - 4x + 1 &= 0 \\ (3x - 1)(x - 1) &= 0 \\ \therefore x = \frac{1}{3} \dots \text{of} \dots x = 1 \\ \therefore y = \frac{5}{3} \dots \text{of} \dots y = 3 \end{aligned}$	<ul style="list-style-type: none"> <li>✓ uitrukking vir <math>y</math></li> <li>✓ substitusie</li> <li>✓ standaard vorm</li> <li>✓ waardes</li> <li>✓ <math>y</math>-waardes</li> </ul>	(5)
	1.4	$\begin{aligned} x^2 - px - p^2 &= 2 \\ \therefore x^2 - px - p^2 - 2 &= 0 \\ \Delta &= b^2 - 4ac \\ \Delta &= (-p)^2 - 4(1)(-p^2 - 2) \\ \Delta &= p^2 + 4p^2 \\ &= 5p^2 + 8 \\ \therefore p^2 &\geq 0 \therefore p \in \mathbb{R} \\ \therefore 5p^2 &\geq 0 \dots\dots\dots p \in \mathbb{R} \\ \therefore 5p^2 + 8 &> 0 \dots\dots\dots p \in \mathbb{R} \\ \therefore \text{wortels is re\"el en ongelyk.} \end{aligned}$	<ul style="list-style-type: none"> <li>✓ vervang in <math>\Delta</math></li> <li>✓ <math>\Delta = 5p^2 + 8</math></li> <li>✓ <math>p^2 \geq 0</math>, <math>5p^2 \geq 0</math> en <math>5p^2 + 8 &gt; 0</math></li> </ul>	(3)

- 1.5 Die 100 m -heining word gebruik vir drie kante omdat die bestaande muur een kant vorm.



$$\text{heining} = 2x + y = 100$$

$$\therefore y = -2x + 100$$

$$\therefore A = xy$$

$$A = x(-2x + 100)$$

$$A = -2x^2 + 100x$$

$$A = -2(x^2 - 50x)$$

$$\therefore A = -2(x^2 - 50x - 625 - 625)$$

$$A = -2(x - 25)^2 - 625$$

$$\text{Maksimum oppervlak: } x = 25$$

$$A = -2(25)^2 + 100(25)$$

$$\therefore A = 1250$$

$$\therefore 1250 = 25y$$

$$\therefore y = 50$$

✓ uitdrukking vir  $y$

✓ uitdrukking vir  $A$

✓ woonoog vir kant

✓ waarde van  $x$

✓ waarde van  $A$

✓ waarde van  $y$

(7)

[39]

**EXAMPLE**

## VRAAG 2

2.1	2.1.1	$\frac{3^{n+2} \cdot 9^{n+1}}{27^{n-1}}$ $\frac{3^{n+2} \cdot 3^{2n+2}}{3^{3n-3}}$ $\frac{3^{3n+4}}{3^{3n-3}}$ $3^{3n+4-3n+3}$ $3^7$	✓ $3^{2n+2}$ en $3^{3n-3}$ ✓ $3^{3n+4-3n}$ ✓ antwoord	(3)
	2.1.2	$\frac{x^2}{1+x}$ $= \frac{(1+\sqrt{3})^2}{1+1+\sqrt{3}}$ $= \frac{1+2\sqrt{3}+3}{2+\sqrt{3}}$ $= \frac{4+2\sqrt{3}}{2+\sqrt{3}}$ $= \frac{2(2+\sqrt{3})^2}{2+\sqrt{3}}$ $= 2$	✓ substitusie ✓ vereenvoudiging ✓ faktorisering ✓ antwoord	(4)
	2.1.3	$\frac{\sqrt{a^2 - b^2} \times (a+b)}{(a-b)^{\frac{1}{2}}}$ $= \frac{(a-b)(a+b) \times (a+b)^{\frac{5}{2}}}{(a-b)^{\frac{1}{2}}}$ $= \frac{(a-b) \times (a+b)^{\frac{1}{2}} \times (a+b)^{\frac{5}{2}}}{(a-b)^{\frac{1}{2}}}$ $(a+b)^{\frac{1}{2}} \times (a+b)^{\frac{5}{2}}$ $(a+b)^3$ $a^3 + 3a^2b + 3ab^2 + b^3$	✓ faktorisering ✓ vereenvoudiging ✓ vereenvoudiging ✓ antwoord	(4)

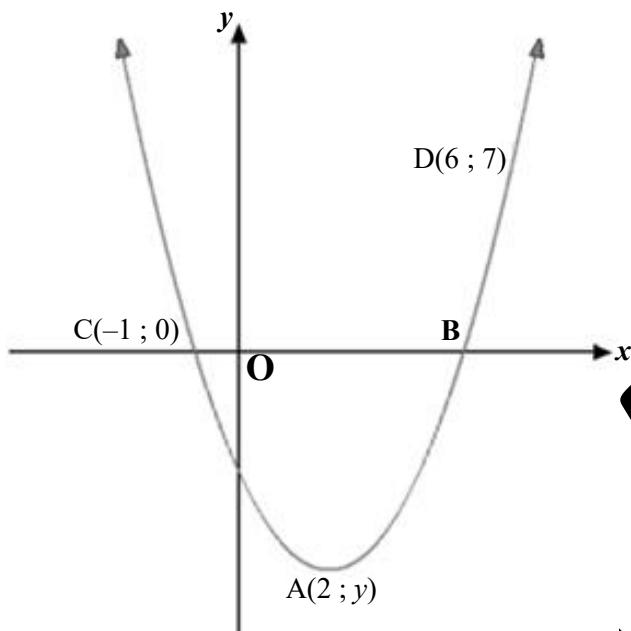
2.2	$RTP: \frac{2}{1+\sqrt{2}} - \frac{8}{\sqrt{8}} = -2$ $\frac{2}{1+\sqrt{2}} - \frac{8}{\sqrt{8}}$ $= \frac{2}{1+\sqrt{2}} - \frac{8}{2\sqrt{2}}$ $= \frac{2(2\sqrt{2}) - 8(1+\sqrt{2})}{2\sqrt{2}(1+\sqrt{2})}$ $= \frac{4\sqrt{2} - 8 - 8\sqrt{2}}{2\sqrt{2} + 2\sqrt{4}}$ $= \frac{4\sqrt{2} - 8 - 8\sqrt{2}}{2\sqrt{2} + 4}$ $= \frac{-4\sqrt{2} - 8}{2\sqrt{2} + 4}$ $= \frac{-4\sqrt{2} + 2}{2\sqrt{2} + 2}$ $= -2$	✓ $2\sqrt{2}$ ✓ $2\sqrt{2}(1+\sqrt{2})$ ✓ vereenvoudiging ✓ faktorisering <span style="font-size: 2em; color: black; opacity: 0.5; transform: rotate(-15deg);">NAPDAAR</span>	(4)
2.3	$MK = LM = 2$ $JM^2 = (2 + \sqrt{3})^2 - 2^2 \text{ pythag}$ $JM^2 = 4 + 4\sqrt{3} + 3 - 4$ $JM^2 = 4\sqrt{3} + 3$ $JM = \sqrt{4\sqrt{3} + 3}$ $A = \frac{1}{2}(4)\sqrt{4\sqrt{3} + 3}$ $A = 6,3 \text{ eenh}^2$	✓ $MK = 2$ ✓ substitusie ✓ vereenvoudiging ✓ $JM$ ✓ vervang in oppervlak formule ✓ antwoord	(6)

## VRAAG 3

3.1	$\begin{aligned} T_2 - T_1 &= T_3 - T_2 \\ 4x + 5 - x &= 10x - 5 - (4x + 5) \\ 3x + 5 &= 10x - 5 - 4x - 5 \\ 3x + 5 &= 6x - 10 \\ \therefore 3x &= 15 \\ \therefore x &= 5 \end{aligned}$	✓ metode ✓ antwoord <span style="font-size: 2em;">X</span> (2)
3.2	3.2.1 $\begin{aligned} -3n + 20 &= -106 \\ 3n &= 126 \\ \therefore n &= 42 \end{aligned}$	✓ gelykstel ✓ antwoord <span style="font-size: 2em;">X</span> (2)
	3.2.2 $\begin{aligned} -3n + 20 &< 0 \\ 20 &< 3n \\ \therefore \frac{20}{3} &< n \\ \therefore n &= 7 \end{aligned}$	✓ $n < 0$ ✓ antwoord <span style="font-size: 2em;">X</span> (2)
	3.2.3    Onewe terme: $17; 11; 5; \dots$ Algemene term: $T_n = 6n + 23$ $\begin{aligned} T_n &= -6(20) + 23 \\ \therefore T_n &= -97 \end{aligned}$	✓ ry ✓ $T_n$ ✓ antwoord <span style="font-size: 2em;">X</span> (3)
3.3	$\begin{aligned} 3; a; 10; b; 21 \end{aligned}$ $\begin{aligned} a - 3; 10 - a; 10; 21 - b \end{aligned}$ $\begin{aligned} 1^{ste} \text{ verskil:} \\ 10 - a - 3 = 1 \\ -2a + 7 = 1 \\ -2a = -6 \\ \therefore a = 3 \end{aligned}$ en $\begin{aligned} 21 - b - b + 10 = 1 \\ -2b + 31 = 1 \\ -2b = -30 \\ \therefore b = 15 \end{aligned}$	✓ $1^{ste}$ verskille ✓ vergelyk $2^{de}$ verskil in terme van $a$ , dan $b$ . ✓ waarde van $a$ ✓ waarde van $b$ <span style="font-size: 2em;">X</span> (4)

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## VRAAG 4

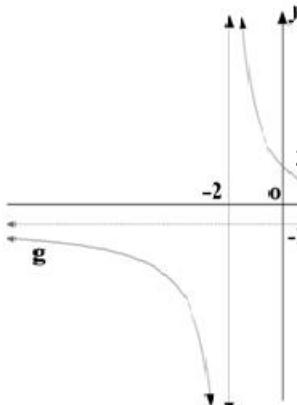


**ANTWERPEN**

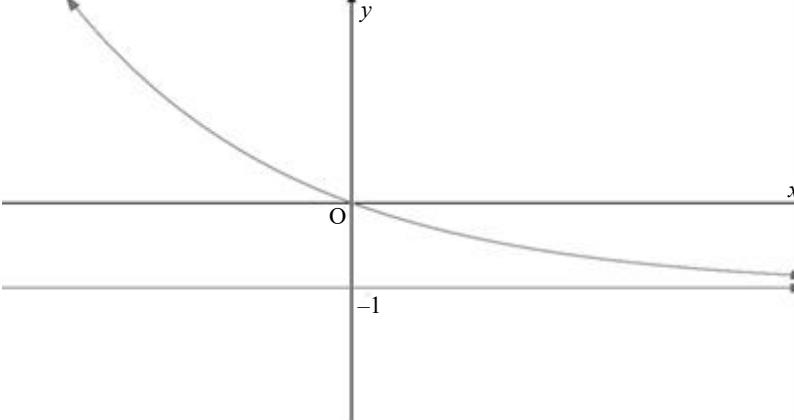
4.1	B(5; 0)	✓✓ antwoord	(2)
NOTA:	Moet in koördinaatvorm wees.		
4.2	$y = a(x - x_1)(x - x_2)$ $\therefore 7 = a(6 - (-1))(6 - 5)$ $7 = 7a$ $\therefore a = 1$ $\therefore y = 1(x + 1)(x - 5)$ $y = x^2 - 5x + x - 5$ $y = x^2 - 4x - 5$	✓ vervang wortels en punt D(6;7) ✓ waarde van $a$ ✓ $y = x^2 - 4x - 5$	(3)
4.3	B(0 ; 0) C(0 ; -5) $m_{BC} = \frac{-5 - 0}{0 - 5}$ $m_{BC} = \frac{-5}{-5}$ $\therefore m_{BC} = 1$ $\therefore m_h = -1$ $\therefore y - y_1 = m(x - x_1)$ $y - (-1) = -1(x - 0) \dots \dots \text{pt}(-1; 0)$ $\therefore y = -x - 1$	✓ $m_{BC}$ ✓ $m_h$ ✓ antwoord	(3)

4.4	$-1 \leq x \leq 0$ $x \geq 5$ <b>OF</b> $x \in [-1 ; 0] \text{ of } [5 ; \infty]$ <b>NOTA:</b> Trek 1 punt af indien hakies foutief is in alternatiewe oplossing.	<ul style="list-style-type: none"> <li>✓ alle kritieke waardes (onafhanklik)</li> <li>✓ antwoorde</li> </ul> <ul style="list-style-type: none"> <li>✓ alle kritieke waardes (onafhanklik)</li> <li>✓ antwoorde</li> </ul>	(2)
<b>[10]</b>			

**VRAAG 5**

5.1	 <p><b>NOTA:</b> Indien die kandidaat die afsnitte berekent en die asymptote slegs maar nie die gesekwets nie, ken 2 punte toe.</p>	<ul style="list-style-type: none"> <li>✓ asimptote</li> <li>✓ afsnitte</li> <li>✓ voorwerp</li> </ul>	(3)
5.2	$\tan 135^\circ = -1$ $y - y_1 = m(x - x_1)$ $y - (-1) = -1(x - 2)$ $y + 1 = -x + 2$ $y = -x + 1$	<ul style="list-style-type: none"> <li>✓ <math>m = -1</math></li> <li>✓ vervang punt <math>(2; -1)</math></li> <li>✓ antwoord</li> </ul>	(3)
5.3	$x < -2$	✓ antwoord	(1)
5.4	5.4.1 5 eenhede regs	✓ antwoord	
	<b>NOTA:</b> Aanvaar 'n antwoord van 5 eenhede.		(1)
5.4.2	3 eenhede op	✓ antwoord	
	<b>NOTA:</b> Aanvaar 'n antwoord van 3 eenhede.		(1)
			<b>[9]</b>

## VRAAG 6

6.1	6.1.1	$y = -6$	✓ antwoord	(1)
	6.1.2	$h(x) = 3 \cdot 2^x - 6$ $0 = 3 \cdot 2^x - 6$ $6 = 3 \cdot 2^x$ $2 = 2^x$ $x = 1$	✓ stel gelyk aan 0 ✓ antwoord	(2)
	6.1.3	$h(x) = 3 \cdot 2^x - 6$ $y = 3 \cdot 2^x - 6$ $y = -3$	✓ antwoord	(1)
	6.1.4	$x > 1$	✓ antwoord	(1)
6.2			✓ x-afsnit ✓ asymptoot ✓ vorm	(3)
				[8]
			TOTAAL:	100