



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P1
NOVEMBER 2025

MARKS: 150

TIME: 3 hours

This question paper consists of 9 pages and 1 information sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of NINE questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. An information sheet with formulae is included at the end of the question paper.
10. Write neatly and legibly.

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QUESTION 11.1 Solve for x :

1.1.1 $x^2 - 11x = -24$ (3)

1.1.2 $5x^2 - x - 8 = 0$ (correct to TWO decimal places) (3)

1.1.3 $42 > x^2 + x$ (4)

1.1.4 $\frac{4}{x^2 - 4} - \frac{10}{x^2 - x - 6} = \frac{1}{x + 2}$ (6)

1.2 Solve for x and y simultaneously:

$2x - y - 1 = 0$ and $x^2 - 2xy + 2x - y^2 = 0$ (6)

1.3 Given: $kx^2 + 5x + k = 0$.For which integer values of k will the roots of the equation be rational? (4)1.4 Calculate the value of x , **without using a calculator**.

$$x = \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}}}}$$

(5)

[31]**QUESTION 2**2.1 Simplify fully, **without using a calculator**:

$$\frac{2^{x+3} - 3 \cdot 2^{x-1}}{2^{x-2}}$$
 (3)

2.2 Solve for x , **without the use of a calculator**:

2.2.1 $x^{\frac{3}{5}} = -8$ (2)

2.2.2 $4^x - 9 \cdot 2^x = -8$ (6)

2.3 If it is given that: $\frac{3^{y+1}}{32} = \sqrt{96^x}$, calculate the values of x and y . (5)**[16]**

QUESTION 3

Given the finite linear pattern: $1 ; 3 ; 5 ; \dots ; 119$

3.1 Determine T_n , the formula for the n^{th} term of the pattern. (2)

3.2 Determine the 20th term of the pattern. (2)

3.3 Determine the number of terms in the pattern. (2)

3.4 Hence, determine the number of terms in the following pattern:
 $10 ; 1 ; 10 ; 3 ; 10 ; 5 ; 10 ; \dots ; 10 ; 119 ; 10$ (2)

3.5 The linear pattern: $1 ; 3 ; 5 ; \dots$ forms the row of first differences of a quadratic number pattern. Q_{99} , term 99 of the quadratic pattern, is 9632. Determine the value of Q_{98} , term 98 of the quadratic number pattern. (3)
[11]

QUESTION 4

Consider the quadratic sequence : $-7 ; -22 ; -35 ; -46 ; \dots$

4.1 Write down the fifth term of the sequence. (1)

4.2 Determine T_n , the n^{th} term of the quadratic sequence. (4)

4.3 Which term of the sequence has a value of 29? (4)

4.4 Determine which two consecutive terms of the quadratic sequence differ with 29. (3)
[12]

QUESTION 5

Given: $f(x) = \frac{4}{x+2} + 1$

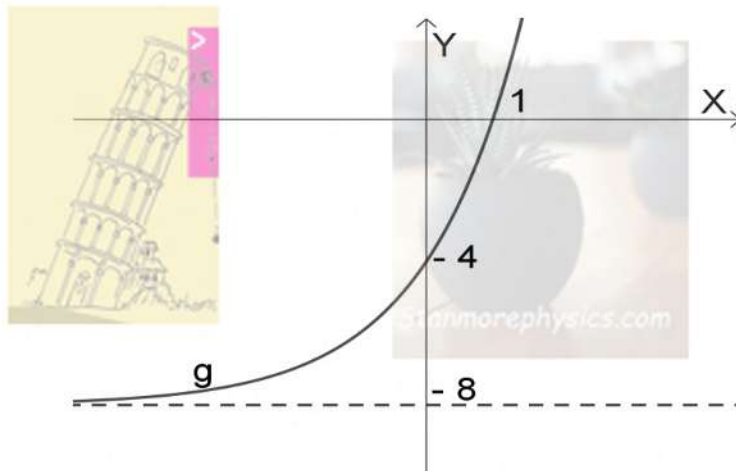
- 5.1 Write down the equations of the asymptotes of f . (2)
- 5.2 Determine the y -intercept of f . (1)
- 5.3 Determine the x -intercept of f . (2)
- 5.4 Sketch the graph of f . Clearly label ALL the intercepts with the axes and any asymptotes. (3)
- 5.5 Write down the domain of f . (2)
- 5.6 Determine the equation of the axis of symmetry of f in the form $y = mx + c$, for $m < 0$. (3)
- [13]**

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QUESTION 6

Sketched below is the graph of $g(x) = a.b^x + q$. The graph of g cuts the x - and y -axis at $(1; 0)$ and $(0; -4)$ respectively. The line $y = -8$ is the asymptote of g .



- 6.1 Write down the value of q . (1)
- 6.2 Determine the values of a and b . (4)
- 6.3 Write down the range of g . (2)
- 6.4 Determine the equation of k , if k obtained when g is reflected about the x -axis and then shifted 2 units to the right.

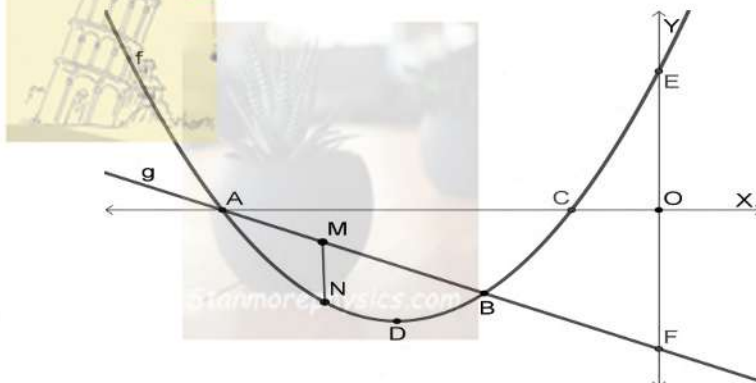
Write your answer in the form of $k(x) = b^x + p$. (4)

[11]

QUESTION 7

Sketched below are the graphs of $g(x) = -x - 5$ and $f(x) = x^2 + 6x + 5$.

- D is the turning point of f .
- E and F are the y -intercepts of f and g respectively.
- A and C are x -intercepts of f .
- A is also the x -intercept of g .



- 7.1 Calculate the co-ordinates of D, the turning point of f . (3)
- 7.2 Calculate the length of:
- 7.2.1 EF (2)
- 7.2.2 AC (3)
- 7.3 The graphs intersect at A and B.
- 7.3.1 Determine the co-ordinates of B. (4)
- 7.3.2 Hence, determine the values of t for which the equation $(x+t)^2 + 6(x+t) + 5 = -(x+t) - 5$ has ONE positive and ONE negative root. (2)
- 7.4 It is further given that MN is parallel to the y -axis between A and B, with M a point on the graph of g and N a point on the graph of f .
- 7.4.1 Write down the length of MN in terms of x . (2)
- 7.4.2 Determine the maximum length of MN. (2)
- 7.4.3 Hence, or otherwise, find the values of k , for which $f(x) + k = g(x)$ will have non-real roots. (2)
- 7.5 Use the graph to determine for what value(s) of x , will $f(x) \cdot g(x) \leq 0$ (2)

[22]

QUESTION 8

8.1 Lethabo has TWO investment option offers:

- Option A: 8,2% p.a. compounded daily (365 days per year)
- Option B: 8,3% p.a. compounded monthly

8.1.1 Calculate the effective interest rate of Option A. (2)

8.1.2 Which investment option is better for Lethabo to take? Justify your answer with the necessary calculations. (2)

8.2 Sam wins R300 000 in a lottery and decides to invest the full amount in to buy a car for each of his two sons when they turn 21.

- His first son, Peter, turns 21 exactly 2 years after the investment was made. On Peter's 21st birthday, Sam withdraws R175 000 to buy Peter a car.
- The investment earns 9% p.a, compounded quarterly for the first four years.
- After that, the interest rate changes to 8.5% p.a, compounded monthly.
- The second son turns 21 six years from Sam's initial investment.

8.2.1 How much money will Sam have available at the end of six years, when his second son turns 21? (5)

8.2.2 The average inflation rate over this period is 8% p.a. Would Sam be fair and consistent towards his two sons if the same amount calculated in QUESTION 8.2.1 is used for his second son's car? Justify your answer with the necessary calculations. (4)

8.2.3 Peter sells his car after 4 years for R79 120. What is the annual rate of depreciation, if calculated using the reducing balance method? (4)
[17]



QUESTION 9

9.1 Baobab High School has 100 Grade 12 learners. Of these, 35 take Mathematics, 30 take Accounting, and 20 take both subjects.

9.1.1 Are the events "taking Mathematics" (M) and "taking Accounting" (A) mutually exclusive events? Motivate your answer. (2)

9.1.2 Are the events "taking Mathematics" (M) and "taking Accounting" (A) independent? Justify your answer with the appropriate calculations. (4)

9.1.3 Draw a Venn-diagram representing the above information. (3)

9.1.4 Use the Venn-diagram to determine $P((\text{not } M) \text{ or } A)$. (2)

9.2 A bag contains a total of 25 balls, which are red or blue. The exact number of each colour is unknown. However, it is known that the probability of drawing a red ball, setting it aside, and then drawing another red ball is $\frac{11}{60}$.

Determine how many red and how many blue balls are in the bag.

(Hint: Let the number of red balls be x .)

(6)

[17]

TOTAL : 150



INFORMATION SHEET: MATHEMATICS GR11

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$



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**PROVINCIAL ASSESSMENT/
PROVINSIALE ASSESSERING**

GRADE 11/GRAAD 11

**MATHEMATICS P1/WISKUNDE V1
NOVEMBER 2025
MARKING GUIDELINES/NASIENRIGLYNE**

MARKS/PUNTE: 150

**These marking guidelines consist of 12 pages.
Hierdie nasienriglyne bestaan uit 12 bladsye.**

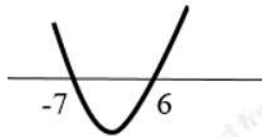
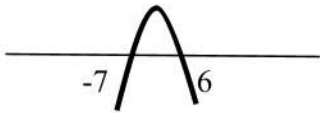
NOTE:

- If a candidate answered a question TWICE, only mark the FIRST attempt.
- Consistent accuracy applies in ALL aspects of the marking guideline.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- Volgehoue akkuraatheid is DEURGAANS op ALLE aspekte van die nasienriglyne van toepassing.

QUESTION/ VRAAG 1

1.1.1	$x^2 - 11x = -24$ $x^2 - 11x + 24 = 0$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">Answer only: 3/3</div> $\therefore (x - 8)(x - 3) = 0$ $\therefore x = 8 \text{ or } \text{ of } x = 3$	✓ standard form/ <i>stdvorm</i> ✓ factors/ <i>faktore</i> ✓ both answers/ <i>beide antwe</i> (3)
1.1.2	$5x^2 - x - 8 = 0$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">Pen. rounding (only 1 mark)</div> $\therefore x =$ $\frac{-(-1) \pm \sqrt{(-1)^2 - 4(5)(-8)}}{2(5)}$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">Answer only: 3/3</div> $\therefore x = 1,37 \text{ or } \text{ of } x = -1,17$	✓ substitution ✓✓ each answ/ <i>elke antw</i> (3)
1.1.3	$42 > x^2 + x$ $x^2 + x - 42 < 0$ $(x + 7)(x - 6) < 0$  $\therefore -7 < x < 6$ <p>OR/OF</p> $42 > x^2 + x$ $-x^2 - x + 42 > 0$ $(x + 7)(6 - x) < 0$  $\therefore -7 < x < 6$	✓ standard form/ <i>vorm</i> ✓ critical values <i>kritiese waardes</i> ✓✓ answer/ <i>antw</i> ✓ standard form/ <i>vorm</i> ✓ critical values <i>kritiese waardes</i> ✓✓ answer/ <i>antw</i> (4)

<p>1.1.4</p>	$\frac{4}{x^2 - 4} - \frac{10}{x^2 - x - 6} = \frac{1}{x + 2}$ $\frac{4}{(x - 2)(x + 2)} - \frac{10}{(x - 3)(x + 2)} = \frac{1}{x + 2}$ $4(x - 3) - 10(x - 2) = (x - 3)(x - 2)$ $4x - 12 - 10x + 20 = x^2 - 5x + 6$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1) = 0$ $x = -2 \text{ NA/nvt or/of } x = 1$	<ul style="list-style-type: none"> ✓✓ factors/faktore ✓ × LCM/KGV (eliminating denominator) ✓ standard form ✓ factors/faktore ✓ answer/antw (6)
<p>1.2</p>	$2x - y - 1 = 0 \dots\dots\dots(1)$ $x^2 - 2xy + 2x - y^2 = 0 \dots\dots\dots(2)$ $y = 2x - 1 \dots\dots\dots(3)$ <p>sub. equ. (3) into equ. (2)</p> $x^2 - 2x(2x - 1) + 2x - (2x - 1)^2 = 0$ $x^2 - 4x^2 + 2x + 2x - 4x^2 + 4x - 1 = 0$ $-7x^2 + 8x - 1 = 0$ $7x^2 - 8x + 1 = 0$ $(7x - 1)(x - 1) = 0$ $x = \frac{1}{7} \text{ or/of } x = 1$ $y = 2\left(\frac{1}{7}\right) - 1 = -\frac{5}{7} \quad y = 2(1) - 1 = 1$ <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px 0;">2nd mistake: BD</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px 0;">Last mark independent of # mistakes</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px 0;">Leading to linear: Max. 2/6</div>	<ul style="list-style-type: none"> ✓ y subject/onderwerp (3rd equation) ✓ substitution ✓ standard form/std vorm ✓ factors/faktore ✓ both x-values/beide x-w ✓ both y-values/beide y-w (6)
<p>1.3</p>	$k^2 + 5x + k = 0$ $\Delta = b^2 - 4ac$ $= (5)^2 - 4(k)(k)$ $= 25 - 4k^2$ <p>Integer values for which Δ is perfect square: Heelgetalle waarvoor Δ 'n volkome vierkant is: k = 0; ± 2</p> <p>OR/OF</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">Answer only: 0/4</div>	<ul style="list-style-type: none"> ✓ substitution (5)² - 4(k)(k) ✓ 25 - 4k² ✓ Δ Perfect square ✓ k = 0; ± 2

	$kx^2 + 5x + k = 0$ $\Delta \geq 0$ and Δ is perfect square $b^2 - 4ac \geq 0$ $(5)^2 - 4(k)(k) \geq 0$ $25 - 4k^2 \geq 0$ $(5 - 2k)(5 + 2k) \geq 0$ $-\frac{5}{2} \leq k \leq \frac{5}{2} \quad k \in \mathbb{Z}$ $k = 0; \pm 1; \pm 2$ $\therefore k = 0; \pm 2$	$\checkmark (5)^2 - 4(k)(k) \geq 0$ $\checkmark (5 - 2k)(5 + 2k) \geq 0$ $\checkmark -\frac{5}{2} \leq k \leq \frac{5}{2} \quad k \in \mathbb{Z}$ $\checkmark k = 0; \pm 2$ <p style="text-align: right;">(4)</p>
1.4	$x = \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}}}}$ $x^2 = 30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}}}}$ $x^2 = 30 + x$ $x^2 - x - 30 = 0$ $(x - 6)(x + 5) = 0$ $x = 6; \quad x \neq -5$	\checkmark square both sides/kwadreer \checkmark substitution of "x" \checkmark standard form/stdvorm \checkmark factors $\checkmark x = 6 \quad x \neq -5$ <p style="text-align: right;">(5)</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Answer only: 0/5</div>
		[31]

QUESTION/VRAAG 2

2.1	$\frac{2^{x+3} - 3 \cdot 2^{x-1}}{2^{x-2}} = \frac{2^x \cdot 2^3 - 3 \cdot 2^x \cdot 2^{-1}}{2^x \cdot 2^{-2}} = \frac{2^x (2^3 - 3 \cdot 2^{-1})}{2^x \cdot 2^{-2}}$ $= \frac{8 - \frac{3}{2}}{\frac{1}{4}} = \frac{13}{2} \times 4 = 26$	\checkmark Factorize/faktoriseer \checkmark simpl & + exp/vereenv & +eksp $\checkmark 26$ <p style="text-align: right;">(3)</p>
2.2.1	$x^{\frac{3}{5}} = -8$ $\therefore \left(x^{\frac{3}{5}}\right)^{\frac{5}{3}} = \left((-2)^3\right)^{\frac{5}{3}}$ $\therefore x = (-2)^5 = -32$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Answer only: 2/2</div> \checkmark power/mag $\frac{5}{3}$ $\checkmark -32$ <p style="text-align: right;">(2)</p>

2.2.2	$4^x - 9 \cdot 2^x = -8$ $2^{2x} - 9 \cdot 2^x + 8 = 0$ $(2^x - 8)(2^x - 1) = 0$ $2^x = 8 = 2^3 \text{ or/of } 2^x = 1 = 2^0$ $x = 3 \text{ or/of } x = 0$	✓ $4^x = 2^{2x}$ ✓ standard form/std vorm ✓ factors/faktore ✓ both equation/beide vgl ✓ $x = 3$ ✓ $x = 0$ (6)
2.2	$\frac{3^{y+1}}{32} = \sqrt{96^x}$ $\frac{3^{y+1}}{2^5} = \sqrt{(2^5 \cdot 3)^x}$ $(2)^{-5} \cdot (3)^{y+1} = (2)^{\frac{5}{2}x} \cdot (3)^{\frac{1}{2}x}$ $-5 = \frac{5}{2}x$ $x = -2$ $y + 1 = \frac{1}{2}x$ $y + 1 = \frac{1}{2}(-2)$ $y = -2$	✓ prime bases/priem grondtalle ✓ exponential laws/ekspwette ✓ equating exponents/ eksp = ✓ $x = -2$ ✓ $y = -2$ (5)
		[16]

QUESTION/VRAAG 3

3.1	$1; 3; 5; \dots; 119$ $T_n = dn + c = 2n + c$ $1 = 2(1) + c$ $c = -1 \Rightarrow T_n = 2n - 1$	✓ $2n$ ✓ $c = -1$ (2)
3.2	$T_{20} = 2(20) - 1 = 39$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">Answer only: 2/2</div>	✓ substitution ✓ 39 (2)
3.3	$119 = 2n - 1$ $n = 60$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">Answer only: 2/2</div>	✓ substitution ✓ $n = 60$ (2)
3.4	$10; 1; 10; 3; 10; 5; 10; \dots; 10; 119; 10.$ <p>Original sequence/oorspronklike ry: $1; 3; 5; \dots; 119$</p> <p>Number of terms in the combined sequence/aantal terme in gekombineerde reeks: $60 + 61 = 121$</p>	✓ +61 ✓ 121 (2) <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 100px;">Answer only: 1/2</div>

3.5	$T_{98} = 2(98) - 1 = 195$ $Q_{98} = 9632 - 195 = 9437$	✓ substitution $T_{98} = 2(98) - 1$ ✓ 195 ✓ 9437 (3)
		[11]

QUESTION/VRAAG 4

4.1	$-7 ; -22 ; -35 ; -46 ; \dots$ 1stD/1eV: $-15 ; -13 ; -11$ 2ndD/2eV: $2 \quad 2$ $T_5 = -55$	✓ -55 (1)
4.2	$2a = 2$ $a = 1$ $3a + b = -5$ $3(1) + b = -5$ $b = -8$ $a + b + c = -7$ $1 + -8 + c = -7$ $c = 10$ $T_n = n^2 - 18n + 10$	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: 1/4</div> ✓ $a = 1$ ✓ $b = -8$ ✓ $c = 10$ ✓ $T_n = n^2 - 18n + 10$ (4)
4.3	$T_n = n^2 - 18n + 10 = 29$ $n^2 - 18n - 19 = 0$ $(n - 19)(n + 1) = 0$ $n = 19 \quad n \neq -1$	✓ $n^2 - 18n + 10 = 29$ ✓ standard form/std vorm ✓ factors/faktore ✓ slegs $n = 19 \quad n \neq -1$ (4)

<p>4.4</p> <p>$-15; -13; -11; \dots$</p> <p>$2n - 17 = 29$</p> <p>$n = 23$</p> <p>Between T_{24} and T_{23}</p> <p>OR/OF</p> <p>$T_{n+1} - T_n = 29$</p> <p>$(n+1)^2 - 18(n+1) + 10 - (n^2 - 18n + 10) = 29$</p> <p>$n^2 + 2n + 1 - 18n - 18 + 10 - n^2 + 18n - 10 = 29$</p> <p>$2n - 17 = 29$</p> <p>$2n = 46$</p> <p>$n = 23$</p> <p>Between T_{24} and T_{23}</p>		<p>✓ $2n - 17$</p> <p>✓ substitution $2n - 17 = 29$</p> <p>✓ answer/antw T_{24} & T_{23} (3)</p>
		[12]

QUESTION/VRAAG 5

<p>5.1</p>	<p>$x = -2$ and/en $y = 1$</p>	<p>✓✓ each answer/elke antw (2)</p>
<p>5.2</p>	<p>$f(0) = \frac{4}{0+2} + 1 = 3 \therefore (0; 3)$ NB must be coordinates</p> <p><i>Moet koördinate wees</i></p>	<p>✓ answer/antw (1)</p>
<p>5.3</p>	<p>$0 = \frac{4}{x+2} + 1$</p> <p>$-x - 2 = 4$</p> <p>$x = -6$</p>	<p>✓ $y = 0$</p> <p>✓ $x = -6$</p> <p>(2)</p>
<p>5.4</p>		<p>✓ both intercepts/beide afsnitte</p> <p>✓ both asymptotes /beide asimptote</p> <p>✓ shape/vorm</p> <p>(3)</p>
<p>5.5</p>	<p>$x \neq -2, x \in R$</p> <p>or/of</p> <p>$x \in (-\infty; -2)$ or/of $(-2; \infty)$</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Answer only: 2/2 ($x \neq -2$)</p> </div>	<p>✓ $x \neq -2$ ✓ $x \in R$</p> <p>OR/OF</p> <p>✓✓ each () /elke hakie (2)</p>

5.6	$y = -x + c \quad (-2; 1)$ $1 = -(-2) + c$ $c = -1$ $y = -x - 1$	Answer only: 3/3	✓ $m = -1$ ✓ subs(-2; 1) ✓ equation/vgl	(3)
				[13]

QUESTION/VRAAG 6

6.1	$q = -8$		✓ $q = -8$	(1)
6.2	$-4 = a.b^0 - 8$ $a = 4$ $g(x) = 4.b^x - 8$ $0 = 4.b^1 - 8$ $b = 2$ $g(x) = 4.2^x - 8$	Answer only: 2/4	✓ substitution (0; -4) ✓ $a = 4$ ✓ substitution (1; 0) ✓ $b = 2$	(4)
6.3	$y > -8, y \in R$	Answer only: 2/2 ($y > -8$)	✓ $y > -8$ ✓ $y \in R$	(2)
6.4	$k(x) = -g(x - 2)$ $k(x) = -4.2^{x-2} + 8$ $k(x) = -2^2.2^{x-2} + 8$ $k(x) = -2^x + 8$	Answer only: 4/4	✓ -4 & $+8$ ✓ exponent $x - 2$ ✓ exponential laws/eksp wette ✓ answer/antw	(4)
				[11]

QUESTION/VRAAG 7

7.1	$x = -\frac{b}{2a} = -\frac{6}{2(1)} = -3$ $f(-3) = (-3)^2 + 6(-3) + 5 = -4$ $D(-3; -4)$	<ul style="list-style-type: none"> ✓ $x = -3$ ✓ substitution: $f(-3)$ ✓ $y = -4$
7.2.1	$E(0; 5) \text{ \& } F(0; -5)$ $EF = 5 - (-5) = 10 \text{ units/eenhede}$	<ul style="list-style-type: none"> ✓ E & F ✓ answer/antw
7.2.2	For / Vir A & C : $x^2 + 6x + 5 = 0$ $(x + 5)(x + 1) = 0$ $x_A = -5$ or $x_C = -1$ $AC = -1 - (-5) = 4 \text{ units/eenhede}$	<ul style="list-style-type: none"> ✓ $y = 0$ ✓ $x = -5$ & $x = -1$ ✓ $AC = 4$
7.3.1	$g(x) = f(x)$ $-x - 5 = x^2 + 6x + 5$ $x^2 + 7x + 10 = 0$ $(x + 5)(x + 2) = 0$ $x_A = -5 \quad x_B = -2$ $y_B = g(-2) = -(-2) - 5 = -3$ $B(-2; -3)$	<ul style="list-style-type: none"> ✓ equating/gelykstel ✓ factors/faktore ✓ choose $x = -2$ / kies $x = -2$ ✓ $y = -3$
7.3.2	$-5 < t < -2$	<ul style="list-style-type: none"> ✓ interval ✓ notation/notasie
7.4.1	$MN = g(x) - f(x) = -x - 5 - (x^2 + 6x + 5)$ $= -x^2 - 7x - 10$	<ul style="list-style-type: none"> ✓ $g(x) - f(x)$ ✓ answer/antw
7.4.2	$x = \frac{-(-7)}{2(-1)} = -\frac{7}{2} = -3,5$ $\text{Max.} = -(-3,5)^2 - 7(-3,5) - 10 = \frac{9}{4} = 2,25$	<ul style="list-style-type: none"> ✓ $x = -3,5$ ✓ $\frac{9}{4} = 2,25$
7.4.3	$k > \frac{9}{4}$	<ul style="list-style-type: none"> ✓✓ answer/antw

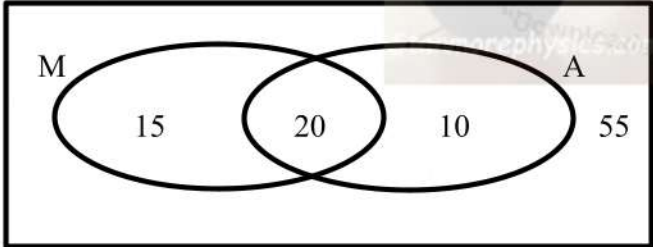
7.5	$k \geq -1$ or/of $k = -5$	$\checkmark k \geq -1$ $\checkmark k = -5$	(2)
			[21]

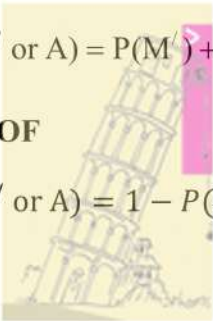
QUESTION/VRAAG 8

8.1.1	$1 + i_{eff} = \left(1 + \frac{i_n}{n}\right)^n$ $A: 1 + i_{eff} = \left(1 + \frac{0,082}{365}\right)^{365} = 1,085445813$ $i_{eff} = 0,085445813 = 8,54\%$	\checkmark substitution in correct formula $\checkmark i = 8,54\%$	(2)
8.1.2	$B: 1 + i_{eff} = \left(1 + \frac{0,083}{12}\right)^{12} = 1,086231401$ $i_{eff} = 0,086231401 = 8,62\%$ $\therefore B$ is better/beter	$\checkmark i = 8,62\%$ $\checkmark B$	(2)
8.2.1	<p style="text-align: center;"> T_0 T_1 T_2 T_3 T_4 T_5 T_6 </p> <p style="text-align: center;"> $\xrightarrow{300\ 000 \quad (175\ 000)}$ $\xleftarrow{9\% \text{ p.a. comp quat}} \quad \xrightarrow{8,5\% \text{ p.a. c.month}}$ </p> <p>Money from investment/Geld van belegging:</p> $A = P(1+i)^n$ $A = 300000 \left(1 + \frac{0,09}{4}\right)^{16} \left(1 + \frac{0,085}{12}\right)^{24}$ $- 175000 \left(1 + \frac{0,09}{4}\right)^8 \left(1 + \frac{0,085}{12}\right)^{24}$ $= R259\ 652,50$ OR/OF At T_2 : $A = 300000 \left(1 + \frac{0,09}{4}\right)^8 - 175000 = 183449,34$ At T_6 : $A = 183449,34 \left(1 + \frac{0,09}{4}\right)^8 \left(1 + \frac{0,085}{12}\right)^{24}$ $= R259\ 652,50$	$\checkmark 300000 \left(1 + \frac{0,09}{4}\right)^{16}$ $\checkmark \left(1 + \frac{0,085}{12}\right)^{24}$ $\checkmark 175000 \left(1 + \frac{0,09}{4}\right)^8$ $\checkmark \left(1 + \frac{0,085}{12}\right)^{24}$ $\checkmark R259\ 652,50$ or/of \checkmark $300000 \left(1 + \frac{0,09}{4}\right)^8 - 175000$ $\checkmark 183449,34$ $\checkmark 183449,34 \left(1 + \frac{0,09}{4}\right)^8$ $\checkmark \left(1 + \frac{0,085}{12}\right)^{24}$ $\checkmark R259\ 652,50$	(5)

8.2.2	$A = P(1 + i)^n$ $A = 175000(1 + 0,08)^4$ $= 238\,085,57$ $\text{Difference} = 259\,652,50 - 238\,085,57 = \text{R}21\,566,93$ <p>Not fair, younger brother gets effectively more</p> <p>Nie regverdig nie, jonger broer kry effektief meer</p>	<p>✓ i & n indep. of formula</p> <p>✓ substitution in correct formula</p> <p>✓ R238 085,57</p> <p>✓ conclusion/gevolgtrekking</p> <p>(4)</p>
8.2.3	$A = P(1 - i)^n$ $\therefore 79\,120 = 175\,000(1 - i)^4$ $\frac{79120}{175000} = (1 - i)^4$ $\therefore \sqrt[4]{\frac{79120}{175000}} = 1 - i$ $\therefore i = 0,180003389 = 18\%$	<p>✓ substitution in correct formula/subst in regte form</p> <p>✓ $\frac{79120}{175000} = (1 - i)^4$</p> <p>✓ $\sqrt[4]{\left(\frac{79120}{175000}\right)} = 1 - i$</p> <p>✓ answer/antw</p> <p>(4)</p>
		[17]

QUESTION/VRAAG 9

9.1.1	<p>No, M and A are NOT mutually exclusive/ <i>Nee, M en A is NIE onderling uitsluitend nie</i></p> $\text{because } P(M \text{ and } A) = \frac{20}{100} = \frac{1}{5} = 0,2 \neq 0$	<p>✓ No/<i>Nee</i></p> <p>✓ reason/<i>rede</i></p> <p>(2)</p>
9.1.2	$P(M) \times P(A) = \frac{35}{100} \times \frac{30}{100} = 0,105$ <p>$P(M \text{ and } A) = 0,2$ $0,2 \neq 0,105$</p> <p>\therefore M and A are not independent events/<i>nie onafhanklik nie</i></p>	<p>✓ $\frac{35}{100} \times \frac{30}{100}$ ✓ 0,105</p> <p>✓ 0,2</p> <p>✓ conclusion/gevolgtrekking</p> <p>(4)</p>
9.1.3		<p>✓ 15</p> <p>✓ 10</p> <p>✓ 55</p> <p>(3)</p>

9.1.4	$P(M' \text{ or } A) = \frac{20+10+55}{100} = \frac{85}{100} = \frac{17}{20} = 0,85$ <p>OR/OF</p>  $P(M' \text{ or } A) = P(M') + P(A) - P(M' \text{ and } A) = \frac{65}{100} + \frac{30}{100} - \frac{10}{100} = 0,85$ <p>OR/OF</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: 2/2</div> $P(M' \text{ or } A) = 1 - P(M \text{ and } A') = 1 - \frac{15}{100} = 0,85$	✓ 85 ✓ answer/antw OR/OF ✓ substitution in correct formula ✓ answer/antw OR/OF ✓ substitution in correct formula ✓ answer/antw (2)
9.2	Let number of red balls be = x / <i>Stel aantal rooi balle = x</i> $P(RR) = \frac{x}{25} \times \frac{x-1}{24} = \frac{11}{60}$ $\frac{x^2 - x}{600} = \frac{11}{60}$ $x^2 - x - 110 = 0$ $(x - 11)(x + 10) = 0$ $x = 11 \quad x \neq -10$ 11 red balls/ <i>rooi balle</i> and 14 blue balls/ <i>blou balle</i> .	$\checkmark \frac{x}{25} \quad \checkmark \frac{x-1}{24}$ $\checkmark \text{prod} = \frac{11}{60}$ $\checkmark \text{factors/faktore}$ $\checkmark 11 \text{ red balls/rooi balle}$ $\checkmark 14 \text{ blue balls/blou balle.}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">Answer only: 0/6</div> (6)
		[17]
		TOTAL: 150 TOTAAL : 150