education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P1
NOVEMBER 2025

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MARKS: 150

TIME: 3 hours

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

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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 1

1.1 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.**

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

(5)

[31]

QUESTION 2

2.1 Simplify fully, **without using a calculator**:

$$\frac{2^{x+3} - 3.2^{x-1}}{2^{x-2}}$$ (3)

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

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

2.2.2 $4^x - 9.2^x = -8$ (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 ; .... ; 119

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

3.2 Determine the 20^{th} 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 ; ... ; 10 ; 119 ; 10 (2)

3.5 The linear pattern: 1; 3; 5; .... 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 ; ...

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]

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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)

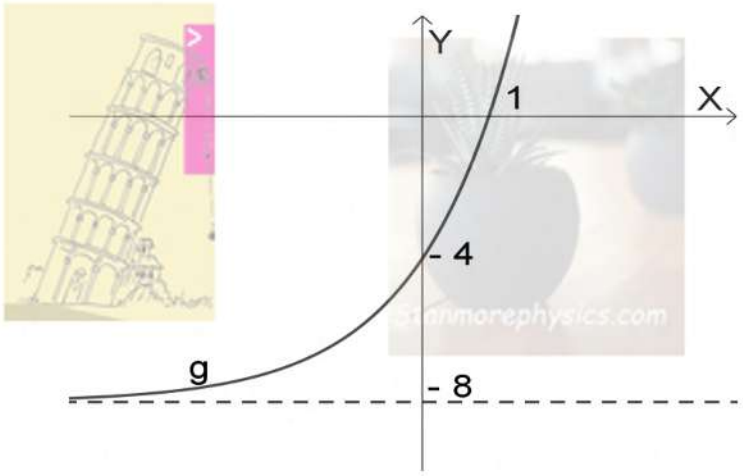
5.6 Determine the equation of the axis of symmetry of f in the form $y = mx + c$, for $m < 0$. (3)

[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)

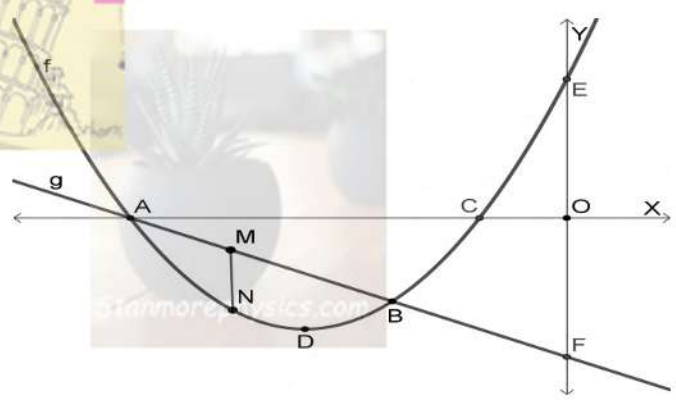
6.4 Determine the equation of k, if k obtained when g is reflected about the x −axis and then shifted 2 units to the right.

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 $f(x).g(x) \leq 0$ (2)

[22]

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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]

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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 $P(\text{(not M) or A})$. (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

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INFORMATION SHEET: MATHEMATICS GR11

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

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad \text{M}\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

In ΔABC: $\dfrac{a}{\sin \text{A}} = \dfrac{b}{\sin \text{B}} = \dfrac{c}{\sin \text{C}}$ $\qquad a^2 = b^2 + c^2 - 2bc.\cos A$

$$area\,\Delta ABC = \frac{1}{2}ab.\sin C$$

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

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

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