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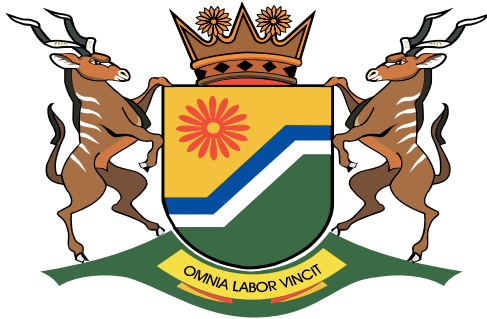
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**MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA**

EHLANZENI DISTRICT

GRADE 12

**MATHEMATICS P1
PRE-TRIAL EXAMINATION
AUGUST 2025**

MARKS: 150

TIME: 3 hours

This question paper consists of 10 pages and 1 information sheet.



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Mathematics P1

1

Ehlanzeni/August 2025

FET-GRADE 12

INSTRUCTIONS AND INFORMATION**Read the following instructions carefully before answering the question**

1. This question paper consists of 12 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 formula is included at the end of the question paper.
10. Write neatly and legibly.





Mathematics P1

2

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QUESTION 11.1 Solve for x :

$$1.1.1 \quad x^2 = x + 6 \quad (3)$$

$$1.1.2 \quad 2x^2 + 7x - 1 = 0 \quad (\text{correct to TWO decimal places}) \quad (3)$$

$$1.1.3 \quad 6 - 2x < 4x^2 \quad (4)$$

$$1.1.4 \quad x - 7\sqrt{x} = -12 \quad (4)$$

1.2 Solve for r and p simultaneously:

$$6r + 5rp - 5p = 8$$

$$r + p = 2 \quad (6)$$

1.3 The volume of a box with a rectangular base is $3\,072 \text{ cm}^3$. The length of the sides are in the ratio 1:2:3. Calculate the length of the shortest sides. (4)

[24]**QUESTION 2**

2.1 Prove that for any arithmetic sequence of which the first term is a and the constant difference is d , the sum to n terms can be expressed as:

$$S_n = \frac{n}{2} [2a + (n - 1)d] \quad (4)$$

2.2 Consider the sequence: $\frac{1}{2}; 4; \frac{1}{4}; 7; \frac{1}{8}; 10; \dots$

2.2.1 If the pattern continues in the same way, write down the next TWO terms in the sequence. (2)

2.2.2 Calculate the sum of the first 50 terms of the sequence. (7)

2.3 Determine the value(s) of x , for which the series: $3 + 3(x + 1) + 3(x + 1)^2 + \dots$ converge. (3)

[16]



Mathematics P1

3

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QUESTION 3

- 3.1 A quadratic number pattern $T_n = an^2 + bn + c$ has a first term equal to 1.
The general term of the first differences is given by $4n + 6$.

3.1.1 Determine the value of a . (2)

3.1.3 Determine the formula for T_n . (4)

- 3.2 Given the series: $(1 \times 2) + (5 \times 6) + (9 \times 10) + (13 \times 14) + \dots + (81 \times 82)$

Write the series in sigma notation. (It is not necessary to calculate the value of the series). (4)

[10]**QUESTION 4**

The lines $y = x + 1$ and $y = -x - 7$ are the axes of symmetry of the function $f(x) = \frac{-2}{x+p} + q$.

4.1 Show that $p = 4$ and $q = -3$. (4)

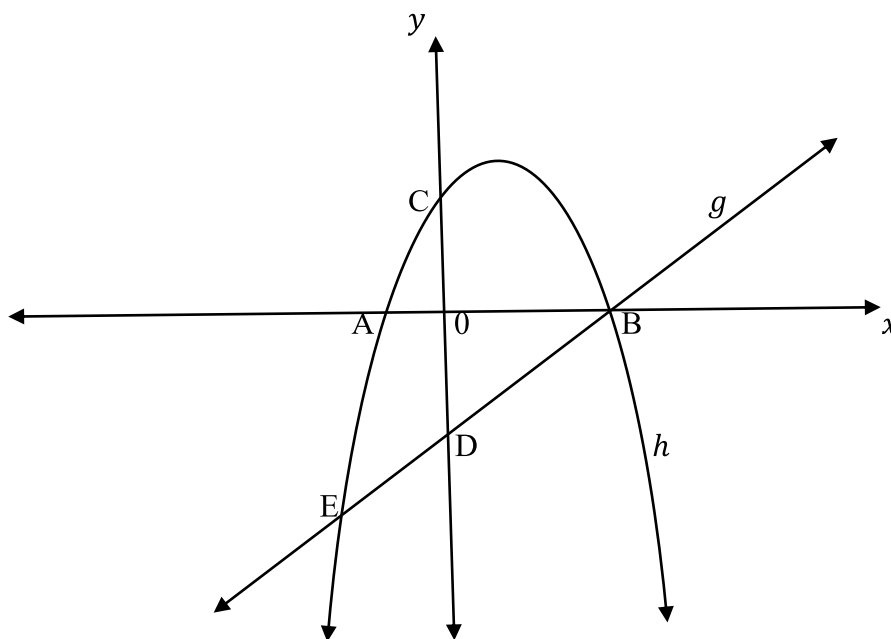
4.2 Calculate the x - intercept of f . (2)

4.3 Sketch the graph of f . Clearly label ALL intercept with the axes and asymptotes. (3)

[9]

QUESTION 5

The sketched below shows the graphs of $h(x) = -x^2 + 2x + 3$ and $g(x) = ax + q$. The graphs intersect at B and E. The graph of h intersect the x -axis at A and B and y -axis at C. The graph of g intersect the y -axis at D. The length of CD is 6 units.

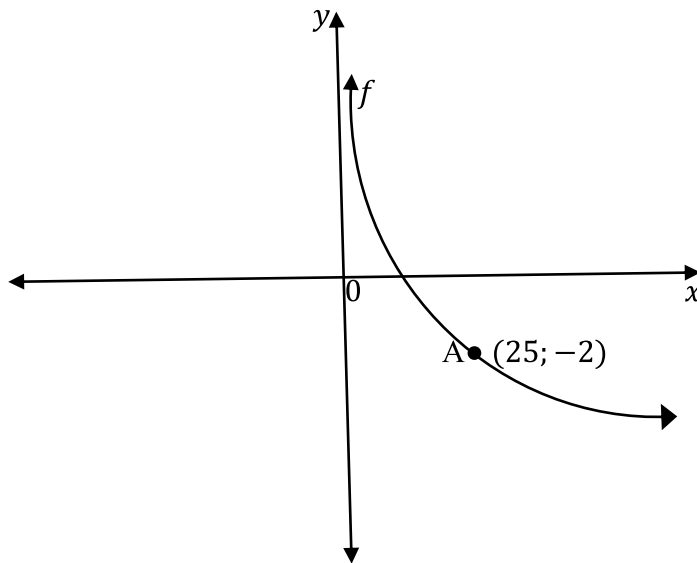


- 5.1 Determine the coordinates of B and C. (4)
- 5.2 Write down the coordinates of D. (2)
- 5.3 Determine the equation of g . (2)
- 5.4 Determine the equation of g^{-1} , the inverse of g in a form of $y = \dots$ (2)
- 5.5 Calculate the coordinates of E. (5)
- 5.6 For which value(s) of x is, $g'(x) \cdot g(x) > 0$? (4)

[19]

QUESTION 6

The graph of $f(x) = \log_b x$ is sketched below. A(25; -2) is a point on f .



- 6.1 Write down the domain of f . (1)
- 6.2 Calculate the value of b . (2)
- 6.3 Determine the equation of f^{-1} in the form of $y = \dots$ (2)
- 6.4 Determine the value(s) of x for which, $\left(\frac{1}{5}\right)^{x+3} - 5 < 20$. (2)

[7]

**QUESTION 7**

- 7.1 Naledi opens a savings account on 1 January 2012. She makes an immediate payment of R2 000 into the account and thereafter a monthly payment of R1 200 at the end of each month.
The last payment is made on 31 December 2013. Interest is calculated at 8% per year, compounded monthly.

7.1.1 Calculate the value of Naledi's investment on 31 December 2013. (5)

- 7.1.2 Naledi decides not to withdraw the money on 31 December 2013. She makes no further payments and the investment earns the same interest rate.

Calculate the value of the investment on 31 May 2014. (3)

- 7.2 Isabel takes out a loan to the value of R150 000. She pays the loan by means of equal monthly instalments which she makes at the end of each month. The first instalment is made three months after the granting of the loan and the last instalment is eight years after the granting of the loan.
The interest rate is 15% per year, compounded monthly.

7.2.1 Calculate the value of the equal monthly instalments. (5)

- 7.2.2 Convert the interest rate to an effective interest rate, rounded to two decimal places. (2)

[15]

QUESTION 8

- 8.1 Given: $f(x) = -3x^2 - p$

8.1.1 Determine $f'(x)$ from FIRST PRINCIPLE. (5)

8.1.2 Hence, calculate the gradient of the tangent of f at $x = 2$. (2)

- 8.2 Determine $\frac{dy}{dx}$ if $xy - 2y = x^2 - x - 2$ (4)

- 8.3 Given: $h(x) = ax^2$; $x > 0$

Determine the value of a if it is given that $h^{-1}(8) = h'(4)$ (6)

[17]





Mathematics P1

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QUESTION 9

For a certain function f , the first derivative is given as $f'(x) = 3x^2 + 8x - 3$

9.1 Calculate the x – coordinates of the stationary points of f . (3)

9.2 For which values of x is f concave down? (3)

9.3 Determine the values of x for which f is strictly increasing. (2)

9.4 If it is further given that $f(x) = ax^3 + bx^2 + cx + d$ and $f(0) = -18$, determine the equation of f . (5)

[13]**QUESTION 10**

A particle moves along a straight line. The distance, s , (in metres) of the particles from a Fixed point on the line at time t seconds ($t \geq 0$) is given by $s(t) = 2t^2 - 18t + 45$.

10.1 Calculate the particle's initial velocity. (2)

10.2 Determine the rate at which the velocity of the particle change at t seconds. (1)

10.3 After how many seconds will the particle be closest to the fixed point? (2)

[5]



Mathematics P1

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QUESTION 11

11.1 Given the digits: 3 ; 4; 5 ; 6 ; 7 ; 8 and 9

Calculate how many unique FIVE-digit codes can be created using the digits above if:

11.1.1 Repetition of digits is NOT allowed in the code. (1)

11.1.2 Repetition of digits IS allowed in the code. (1)

11.2 How many unique 3-digits codes can be formed using the above digits, if:

- Digits may be repeated.
- The code is greater than 400 but less than 600.
- The code is divisible by 5. (3)

11.3 The events S and T are independent: $P(S \text{ and } T) = \frac{1}{6}$ and $P(S) = \frac{1}{4}$

11.3.1 Represent the given information on a Venn diagram. Indicate on the Venn diagram the probabilities associated with each region. (3)

11.3.2 Determine $P(S \text{ or NOT } T)$. (2)**[10]****QUESTION 12**

12.1 The success rate of PSG soccer team depends on a number of factors. The fitness of the players is one of the factors that influence the outcome of a match.

- The probability that all the players are fit for the next match is 70%
- If all the players are fit to play the next match, the probability of winning the next match is 85%
- If there are players that are not fit to play the next match, the probability of winning the next match is 55%

Based on the fitness alone, calculate the probability that the PSG soccer team will win the next match. (5)

[5]**TOTAL: 150**

**INFORMATION SHEET**

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

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

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

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

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

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2} [2a + (n - 1)d]$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

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

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

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

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

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

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

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\begin{aligned} \cos 2\alpha &= \cos^2 \alpha - \sin^2 \alpha \\ &= 1 - 2\sin^2 \alpha \\ &= 2\cos^2 \alpha - 1 \end{aligned}$$

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

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

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

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

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

