Name and Surname : ……...

Grade/Class : 10/……. **Mathematics Teacher** : …….

Hudson Park High School

GRADE 10

MATHEMATICS

2025

November Paper 1

Marks : 100 Date : 14 November 2025

Time : 2 hours

Examiner(s) : SLT VNT PHL VPT SBL Moderator(s) : SLT VNT PHL VPT SBL

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.

2. Number your answers clearly and accurately, exactly as they appear on the question paper.

3. **A blank space of at least two lines should be left after each answer. Start each QUESTION at the TOP of new page.**

4. **Fill in the details requested on the front of this Question Paper, before you start answering any questions.**

   Hand in your submission in the following manner :

   (on top) **Answers (on lined paper, stapled together in order)**
   (below) **Question Paper**

   Please **DO NOT STAPLE** your Answers and Question Paper together.

5. Employ relevant formulae and show all working out.
   Answers alone *may* not be awarded full marks.

6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.

7. Answers must be written in blue or black ink, as distinctly as possible, on both sides of the page. An HB pencil (but not lighter eg. 2H) may be used for diagrams.

8. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.

9. If (Euclidean) GEOMETRIC statements are made, REASONS must be stated appropriately.

QUESTION 1

CALCULATORS MAY NOT BE USED IN THIS QUESTION

1.1. State whether the following statement is TRUE or FALSE :

Integers , whole numbers and natural numbers are all rational numbers. (1)

1.2. Between which two consecutive integers does $-\sqrt{115}$ lie ?
Show all working out. (2)

1.3. Convert $2,1\dot{3}$ into a simplified improper fraction.
Show all working out. (3)

[6]

QUESTION 2

2.1. Simplify the following as far as possible :

2.1.1. $2x^{\frac{3}{5}}\left(\frac{1}{2}x^{\frac{5}{3}} - \frac{5}{4}x^{-\frac{3}{5}}\right)$ (2)

2.1.2. $\frac{9^x}{2.9^{x-1} - 3^{2x-1}}$ (without the use of a calculator) (4)

2.2. Factorise fully :

2.2.1. $x^3 - 2x^2 - x + 2$ (2)

2.2.2. $8x^3 - \frac{27}{64}y^3$ (2)

2.3. If : $\frac{5}{x} - \frac{x}{5} = 5$, determine the value of : $\frac{25}{x^2} + \frac{x^2}{25}$. (2)

[12]

QUESTION 3

3.1. Solve for x : $2x = -\frac{5}{x} + 7$ (3)

3.2. Solve for x : $3x^{-\frac{2}{5}} - 18 = 0$ (3)

3.3. Given : $-3 \leq 7 - 5x < 12$

3.3.1. Solve for x. (2)

3.3.2. State your answer to (3.3.1.) in interval notation. (1)

3.4. Solve for x and y simultaneously :

$3x - y - 9 = 0$ and $3x + 2y + 4 = 0$. (4)

[13]

QUESTION 4

4.1 Given : $-104\ ;\ -101\ ;\ -98\ ;\ ...$

4.1.1. Write down the next term in the sequence. (1)

4.1.2. Determine an expression for the general term of the sequence, T_n.
Simplify your answer. (2)

4.1.3. (a) Determine the position of the first term in the sequence which will have a positive value. (2)

(b) Now, write down the value of the first term in the sequence that will have a positive value. (1)

4.2. Two different arithmetic sequences have the same 5^{th} term, but different first terms.

First sequence : first term is 4 and the constant difference is 3
Second sequence : constant difference is 5.

Calculate the first term of the second sequence. (3)

4.3. Given the linear number pattern : $x + 3\ ;\ 3x + 2\ ;\ 6x - 1\ ;\ ...$

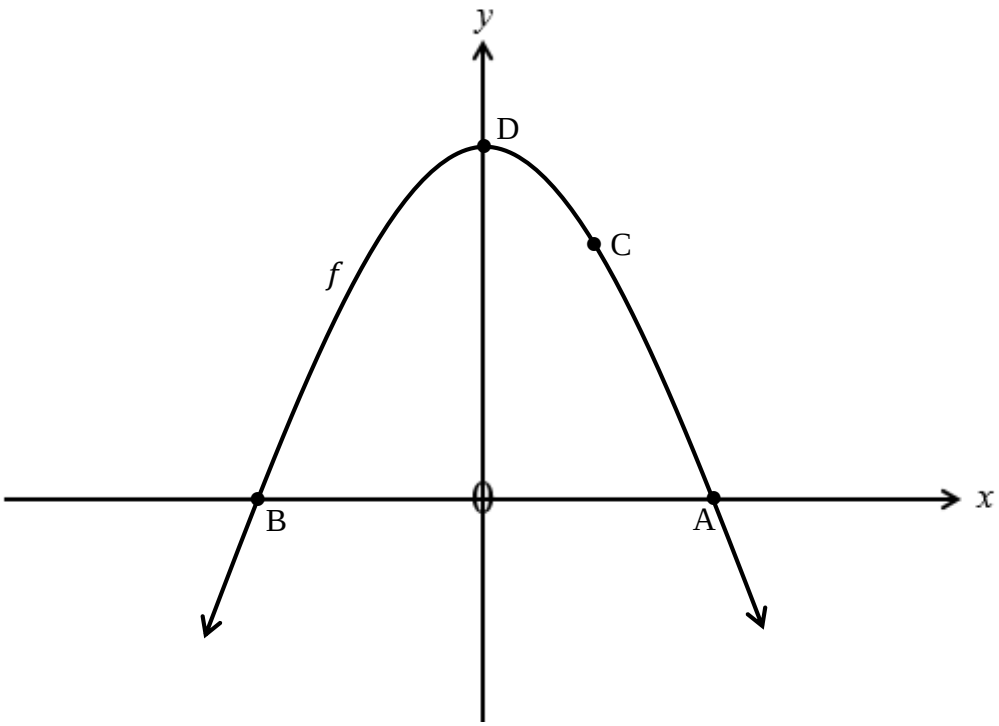
4.3.1. Determine the value of x. (2)

4.3.2. Hence, write down the value of the third term of the given number pattern. (1)

[12]

QUESTION 5

5. Sketched below is the graph of : $f(x) = ax^2 + q$.
A$(2; 0)$, C$(1; 6)$ and D is the turning point of f.



5.1. Write down the equation of the axis of symmetry of f. (1)

5.2. Write down the coordinates of B. (1)

5.3. Determine the values of a and q, showing that they will be -2 and 8, repectively. (3)

5.4. For which values of x is f increasing ? (1)

5.5. For f, write down the

5.5.1. domain (1)

5.5.2. range (1)

5.6. If f is reflected in the x-axis and then moved 5 units vertically downwards to become g, determine the equation of g in the form $y = kx^2 + p$. (2)

[10]

QUESTION 6

6. Given : $h(x) = -5^x + 2$.

Sketch a neat graph of h, showing all working out and labeling all relevant details on your graph. **[5]**

QUESTION 7

7. Given : $f(x) = -x^2 + 4$

and

$g(x) = -\frac{6}{x} - 3 \quad (x < 0)$

7.1. Determine :

7.1.1. $f(-1)$ (1)

7.1.2. $g(-1)$ (1)

7.2. For g, write down the equations of the :

7.2.1. vertical asymptote (1)

7.2.2. horizontal asymptote (1)

7.3. On the same set of axes, sketch neat graphs of f and g.
Show all working out and label all relevant details on your graphs. (6)

7.4. Write down the equation(s) of the axis(es) of symmetry of g. (1)

7.5. Use your graphs to solve for x : $-x^2 + 4 \leq 0$ (1)

[12]

QUESTION 8

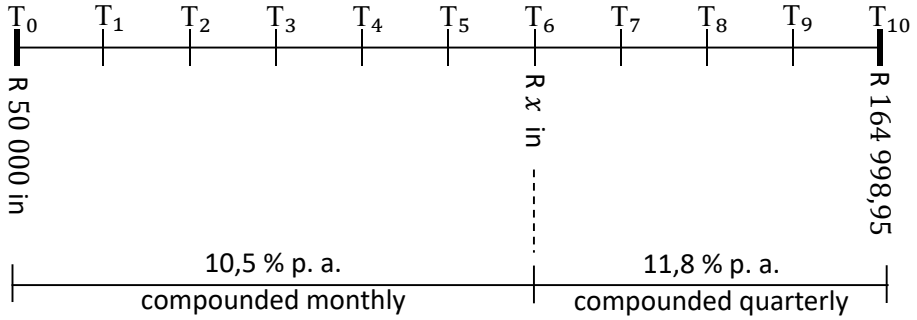
8.1. Mr Rodemann saw an advertisement on METU for a touch screen laptop that he wanted for his classroom. The laptop was advertised for R999, but a deposit of x % (of the purchase price is required). Mr Rodemann decided to buy the laptop on higher purhase with an interest rate of 8,5 % p.a. over 2 years. An insurance fee of R 25 will also be charged each month.

8.1.1. If Mr Rodemann has to pay a deposit of R119,88, calculate the value of x. (1)

8.1.2. What will Mr Rodemann's monthly repayments be ? (5)

8.2. Devan joined an Engineering firm at the start on 1st January 2020.
By the 31st December 2020, his annual salary was R385 000 p. a..
His annual salary then grew to R576 000 p. a. by the 31st December 2025.
Determine the rate of inflation of Devan's salary, as a % p. a.. (3)

8.3. An investment account is opened and immediately R50 000 is deposited into the account. Six years later an additional R x is deposited into the account. During the first 6 years, interest is calculated at 10,5 % p. a. compound monthly. The interest rate, for the following four years, then changes to 11,8 % p. a. compounded quarterly. At the end of the 10 year period, the investment account has a balance of R 164 998,65.



Calculate the value of x, to the nearest rand. (5)

[14]

QUESTION 9

9.1. For two events, A and B, it is given that :

- $P(A) = 0{,}25$
- $P(B) = 0{,}89$
- $P((A \text{ or } B)') = 0{,}05$

9.1.1. Determine P(A or B). (1)

9.1.2. Calculate P(A and B). (2)

9.1.3. Draw a fully labelled probability Venn Diagram representing the given information. (2)

9.1.4. Hence, determine :

(a) $P(A \cap B')$ (1)

(b) $P(A \cup B')$ (1)

9.2. Complete the following statements, simplifying fully where necessary :

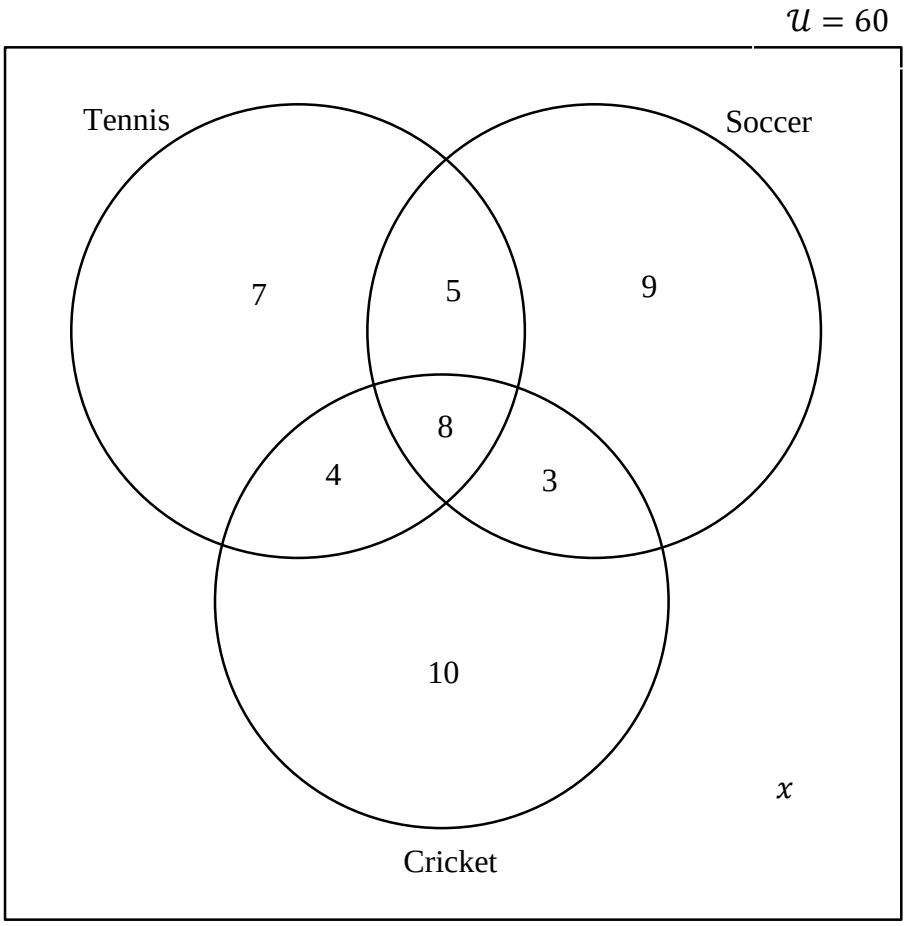
9.2.1. For mutually exclusive events :

(a) $P(A \text{ and } B) = \cdots$ (1)

(b) $P(A \text{ or } B) = \cdots$ (1)

9.2.2. For complementary events : $P(A \text{ or } B) = \cdots$ (1)

9.3. Learners at a school were surveyed about the sports they play. A Venn diagram was drawn to represent their responses :



Use the Venn diagram to answer the following questions :

9.3.1. Calculate the value of x. (1)

9.3.2. How many learners :

(a) Play only one of the sports ? (1)

(b) Play only two of the sports ? (1)

(c) Play at least two of the sports ? (1)

9.3.3. What is the probability that a learner, selected at random, will play tennis ? (2)

[16]

TOTAL 100