KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS

SEPTEMBER TEST

2025

MARKS: 75

TIME: $1\frac{1}{2}$ **hours**

This question paper consists of 8 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 6 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. which 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 correct to TWO decimal places, unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

1.1 Consider the sequence: **17 ; 15 ; 13 ; ...**

1.1.1 Write down the value of the next term in the sequence. (1)

1.1.2 Determine the n^{th} term (T_n) of the sequence. (2)

1.1.3 Which term of the sequence will be equal to -71? (2)

1.2 Calculate the value of x if the first three consecutive terms of a linear pattern are:
$3x - 2$; $4x + 7$ and $2x - 5$. (3)

1.3 Consider the following number pattern:

9 ; 5 ; 9 ; 8 ; 9 ; 11 ; 9 ; 14 ; 9 ;...

1.3.1 Write down the 67^{th} term of the pattern. (1)

1.3.2 Calculate the value of the 500^{th} term of the pattern. (3)

1.4 Consider the sequence: $\frac{10}{8}$; $\frac{14}{13}$; $\frac{18}{18}$; $\frac{22}{23}$; $\frac{26}{28}$; $\frac{30}{33}$; ...

Determine the n^{th} term (T_n) of the sequence. (3)

[15]

QUESTION 2

2.1 Amanda invests R25 000 for 9 years into a savings account that pays 8,25% per annum compound interest.

2.1.1 Calculate the accumulated value of the investment at the end of 9 years. (3)

2.1.2 She leaves the money in the account for a further three years. The interest rate changes to 6% per annum simple interest. How much money will she then have saved? (3)

2.2 South Africa's population is increasing by 2,5% per year. If the current population is 64,7 million, what was the population three years ago? (2)

2.3 On a certain day the exchange rate between the US dollar and the South African rand is \$1 = R18,16. At the same time the exchange rate between the British pound and the South African rand is £1 = R23,52. Calculate the exchange rate between the British pound and the US dollar on that day. (2)

[10]

QUESTION 3

3.1 Two events, A and B, are complementary. $P(B') = 0,45$.

3.1.1 Copy and complete the statement: $P(A) + P(B) = \ldots$ (1)

3.1.2 Write down the value of:

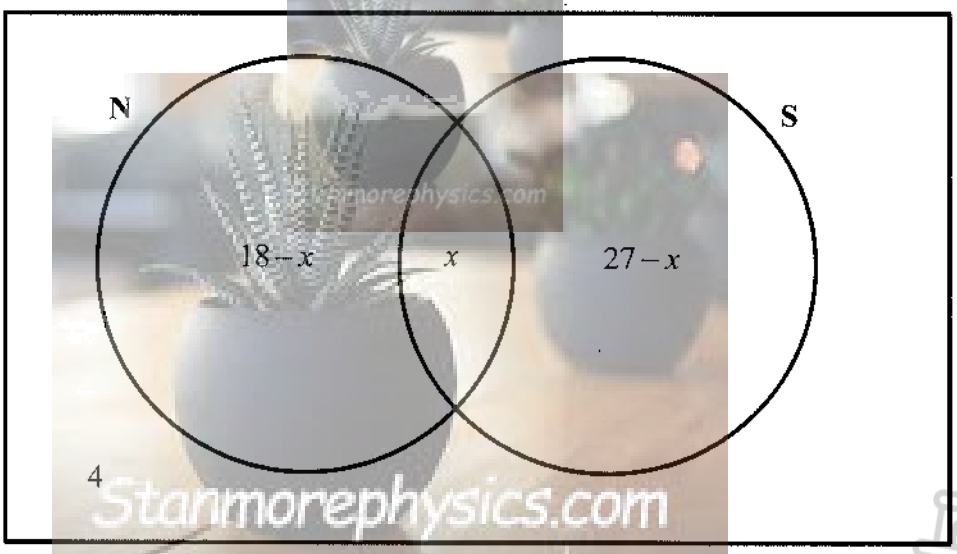
(a) $P(A \text{ and } B)$ (1)

(b) $P(A)$ (1)

3.2 In a certain class of 33 girls:

- 18 play netball (N)
- 27 play soccer (S)
- 4 do not play netball or soccer
- An unknown number (x) play both netball and soccer.

The information is represented in the Venn diagram below.



3.2.1 Calculate the value of x. (3)

3.2.2 If a girl from this class is chosen at random, calculate the probability that she:

(a) does not play netball or soccer. (1)

(b) plays only netball. (2)

3.3 There are 120 customers at a shop in KwaZulu Natal. 111 customers bought rice (R), 74 customers bought flour (F) and 67 bought both rice and flour.

3.3.1 Represent the above information in a Venn diagram. (4)

3.3.2 Hence, calculate $P((\text{not R}) \text{ and F})$ (2)

[15]

QUESTION 4

4.1 The data below represents the mass (in kg) of sixty learners participating in sports activities at a school in Newcastle.

Mass (in kg)	Frequency	Midpoint	Midpoint × Frequency
$30 \leq m < 40$	9	a	315
$40 \leq m < 50$	17	45	765
$50 \leq m < 60$	13	55	b
$60 \leq m < 70$	7	65	455
$70 \leq m < 80$	c	75	675
$80 \leq m < 90$	5	85	425

4.1.1 Determine the value of a, b, and c. (3)

4.1.2 Use the table above to calculate the estimated mean mass. (2)

4.1.3 Identify the modal interval. (1)

4.1.4 Determine the interval containing the median. (1)

4.2 The ordered data below shows the number of ice-creams sold at a tuckshop, during break time, over TEN DAYS in summer.

30	33	33	x	43	45	55	61	78	80

4.2.1 Determine the median of the number of ice-creams sold. (1)

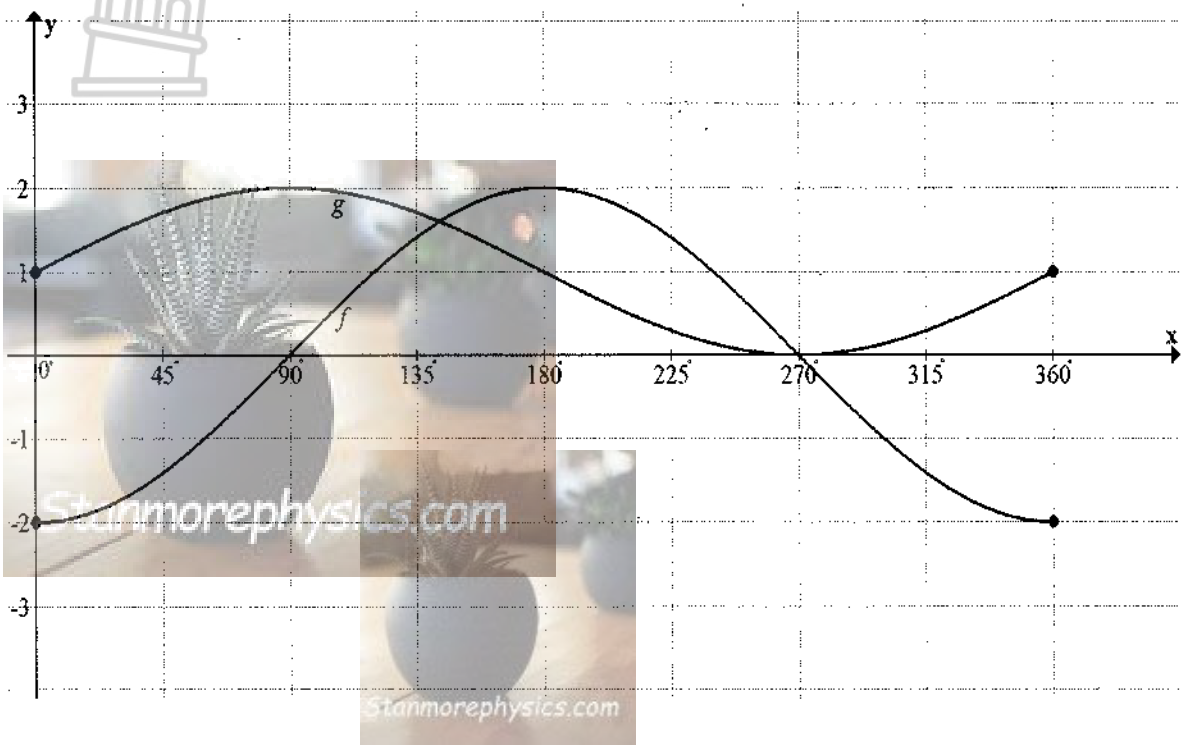
4.2.2 Calculate the interquartile range (IQR). (3)

4.2.3 If the mean number of ice-creams sold is $49{,}5$, determine the value of x. (3)

[14]

QUESTION 5

In the diagram below, the graphs of $f(x) = -2\cos x$ and $g(x) = \sin x + 1$ is drawn for the interval $0° \leq x \leq 360°$.



5.1 Write down:

(a) the amplitude of f. (1)

(b) the period of g. (1)

(c) the minimum value of $g(x) - 1$. (1)

5.2 Determine the value of $f(180°) - g(180°)$. (2)

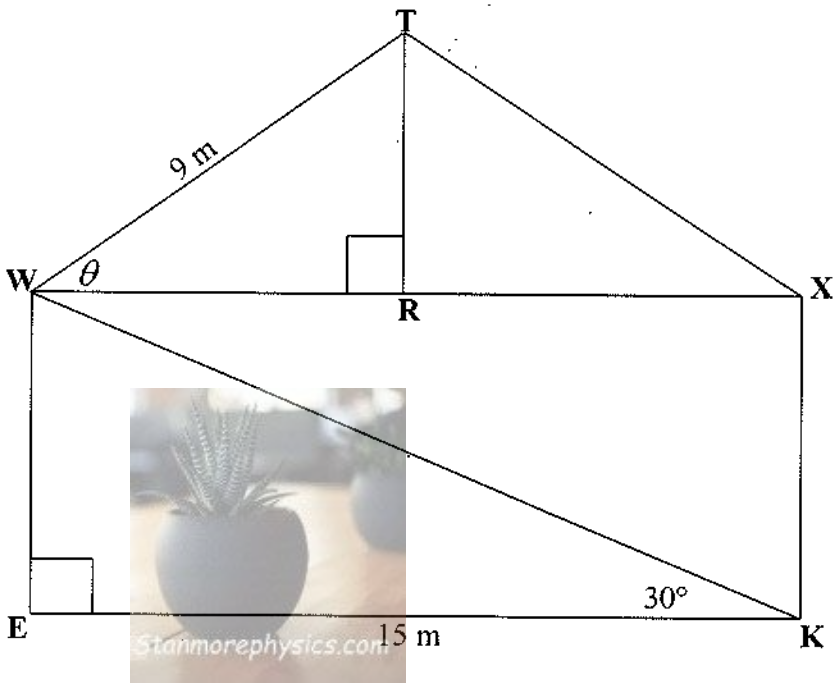
5.3 For which value(s) of x will $g(x) \times f(x) \leq 0$? (3)

5.4 Determine the range of $h(x)$ if $h(x) = -g(x) + 3$. (3)

[11]

QUESTION 6

An architectural design of the front view of a house is given below. The length of the house is to be 15 metres. An exterior stairway leading to the roof is to form an angle of elevation of 30° with the ground level. The slanted part of the roof must be 9 metres in length.
θ is an angle of elevation of T from W and WT = TX.



6.1 Calculate the length of the wall (WE). Leave the answer in simplest surd form. (2)

6.2 Determine the size of θ, correct to TWO decimal places. (3)

6.3 Calculate the area of triangle WTX. (5)

[10]

TOTAL: 75 MARKS

FINAL

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MARKING GUIDELINE

MARKS: 75

This marking guideline consists of 7 pages.

CAPS – Grade 10
Marking Guideline

QUESTION 1

Consider the sequence: 17 ; 15 ; 13 ; ...			
1.1.1	$T_4 = 11$	✓A answer	(1)
1.1.2	$T_n = -2n + 19$ **OR** $T_n = 19 - 2n$	✓A $-2n$ ✓A $+19$	(2)
1.1.3	$-71 = -2n + 19$ $-90 = -2n$ $n = 45$ $\therefore T_{45} = -71$	✓CA equating ✓ CA answer $(n \in \mathbb{N})$	(2)
1.2	$4x + 7 - (3x - 2) = 2x - 5 - (4x + 7)$ $x + 9 = -2x - 12$ $3x = -21$ $\therefore x = -7$	✓ A equating 1st diff. ✓ CA simplification ✓ CA answer	(3)
1.3.1	$T_{67} = 9$	✓ A answer	(1)
1.3.2	$T_n = 3n + 2$ $T_{250} = 3(250) + 2$ $\therefore T_{500} = 752$	✓ A $3n + 2$ ✓CA subst n = 250 ✓CA answer	(3)
1.4	Numerator: $T_k = 4k + 6$ Denominator: $T_p = 5p + 3$ $\therefore T_n = \frac{4n + 6}{5n + 3}$ **Answer Only: Full Marks.**	✓A numerator ✓A denominator ✓CA answer	(3)
			[15]

CAPS – Grade 10
Marking Guideline

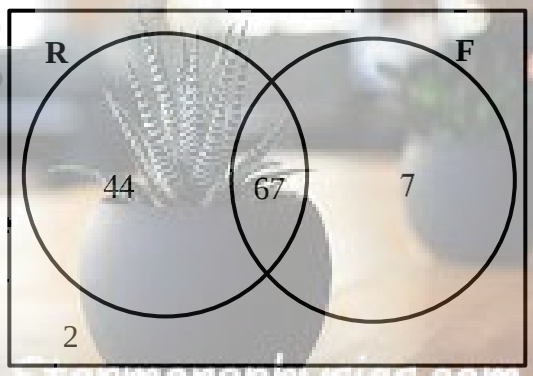
QUESTION 2

2.1.1	$A = P(1+i)^n$ $A = 25000(1+0,0825)^9$ $A = \text{R}51025,96$ OR $A = P\left(1+\frac{r}{100}\right)^n$ $A = 25000\left(1+\frac{8,25}{100}\right)^9$ $A = \text{R}51025,96$	✓A formula ✓A substitution ✓CA answer	(3)
2.1.2	$A = P(1+in)$ $A = 51025,96[1+(0,06)(3)]$ $A = \text{R}\,60\,210,63$ **OR** $A = P\left(1+\frac{nr}{100}\right)$ $A = 51025,96\left(1+\frac{(6)(3)}{100}\right)$ $A = \text{R}\,60\,210,63$ **OR** $I = p \times i \times n$ $= 51025,96 \times 0,06 \times 3$ $= \text{R}9184,67$ $\therefore A = P + I$ $= 51025,96 + 9184,67$ $= \text{R}60210,63$	✓A formula ✓CA substitution ✓CA answer	(3)
2.2	$P = 64700000(1+0,025)^{-3}$ $P = 60080381$ people **OR** $64700000 = P[1+(0,025)]^3$ $P = 60080381$ people **Penalise 1 mark if** $P \notin \mathbb{N}$	✓A substitution ✓CA answer	(2)

2.3	$£1 = R23,52 \times \frac{\$1}{R18,16}$ $£1 = \$1,30$ **OR** $\$1 = R18,16 \times \frac{£1}{R23,52}$ $\$1 = £0,77$	✓A product ✓CA answer	(2)
			[10]

QUESTION 3

3.1.1	$P(A) + P(B) = 1$	✓A 1	(1)
3.1.2(a)	$P(A \text{ and } B) = 0$	✓A 0	(1)
3.1.2(b)	$P(A) = 0,45$	✓A answer	(1)
3.2.1	$18 - x + x + 27 - x + 4 = 33$ $49 - x = 33$ $x = 16$ **OR** $18 - x + x + 27 - x + 4 = 33$ $49 - x = 33$ $x = 16$	✓A equation ✓CA simplification ✓CA answer $(x \in \mathbb{N})$	(3)
3.2.2(a)	$P(none) = \frac{4}{33}$	✓A answer	(1)
3.2.2(b)	$P(N\ only) = \frac{2}{33}$	✓CA 2 ✓CA answer	(2)

3.3.1		✓A 44 ✓A 67 ✓A 7 ✓A 2	(4)
3.3.2	$P((\text{not R}) \text{ and F}) = \frac{7}{120}$	✓CA 7 ✓A 120 (denom)	(2)
			[15]

QUESTION 4

4.1.1	$a = 35$ (also accept $a = 57, 2$) $b = 715$ $c = 9$	✓A ✓A ✓A	(3)
4.1.2	Estimated mean $= \frac{3350}{60}$ $\left(\text{also accept } \frac{3550}{60}\right)$ $= 55,83$ $(= 59,17)$ **Answer Only: Full Marks.**	✓CA substitution ✓CA answer	(2)
4.1.3	$40 \le m < 50$	✓CA answer	(1)
4.1.4	$50 \le m < 60$	✓CA answer	(1)
4.2.1	Median $= \frac{43+45}{2}$ $= 44$	✓A answer	(1)
4.2.2	IQR $= 61 - 33$ $= 28$	✓A Q_3 ✓A Q_1 ✓CA answer	(3)

4.2.3	$\frac{30+33+33+x+43+45+55+61+78+80}{10}=49,5$ $495=458+x$ $x=37$	✓A sum divided by 10 ✓A equating to 49,5 ✓CA answer	(3)
			[14]

QUESTION 5

5.1(a)	amplitude $=2$	✓A answer	(1)
5.1(b)	period $=360°$	✓A answer	(1)
5.1(c)	minimum value $=-1$	✓A answer	(1)
5.2	$f(180°)=2$ $g(180°)=1$ $\therefore f(180°)-g(180°)=1$ **Answer Only: Full Marks.**	✓A $f(180°)=2$ ✓CA answer (based on $f(180°)$)	(2)
5.3	$0° \le x \le 90°$ or $270° \le x \le 360°$ **OR** $x \in [0° ; 90°] \cup [270° ; 360°]$	✓A $0° \le x \le 90°$ ✓A $270° \le x \le 360°$ ✓A both have correct notation **OR** ✓A $x \in [0° ; 90°]$ ✓A $\cup [270° ; 360°]$ ✓A both have correct notation	(3)
5.4	$h(x)=-(\sin x+1)+3$ $h(x)=-\sin x-1+3$ $h(x)=-\sin x+2$ $\therefore 1 \le y \le 3$ **OR** $y \in [1 ; 3]$ **Answer Only: Full Marks.**	✓A $h(x)=-\sin x+2$ ✓CA interval ✓A notation	(3)
			[11]

QUESTION 6

6.1	$\tan 30° = \frac{WE}{15}$ $15\tan 30° = WE$ $5\sqrt{3}\text{ m} = WE \quad (\text{accept } WE = 8,66\text{ m})$	✓A $\tan 30° = \frac{WE}{15}$ ✓A answer	(2)
6.2	$WR = 7,5\text{ m}$ $\cos\theta = \frac{WR}{WT}$ $\cos\theta = \frac{7,5}{9}$ $\theta = 33,56°$	✓A length of WR ✓CA substitution ✓CA answer	(3)
6.3	$TR^2 = 9^2 - 7,5^2$ Pythag $TR = \frac{3\sqrt{11}}{2}$ $\text{Area} = \frac{1}{2}b.h$ $= \frac{1}{2}(15)\left(\frac{3\sqrt{11}}{2}\right)$ $= 37,31\text{ m}^2$	✓A correct sub Pythag ✓CA length of TR ✓A formula ✓CA subst ✓CA answer	(5)
			[10]

TOTAL: 75 MARKS