KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MARKS: 75

TIME: 1 hour 30 minutes

This question paper consists of 6 pages and 1 separate diagram sheet

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

An advertisement in a local newspaper reads as follows:

- Buy an iPhone 14 Pro Max cell phone for only R1 029 per month.
- You have 36 months to pay.
- No deposit is required.

1.1 Calculate the total amount to be paid over a period of 36 months. (1)

1.2 The monthly instalment quoted in the advertisement, is calculated on a hire purchase agreement which charges interest of 8,2% p.a. on the cash price of the cell phone. Calculate the cash price of the cell phone. (3)

1.3 The cost of the cell phone is subject to inflation and increases to a cash price of R31 968, 11 after 3 years. Calculate the annual inflation rate. (4)

[8]

QUESTION 2

2.1 On a trip to America, Charity booked into a hotel for five days. The exchange rate at that time was $1=R18,73. The cost of the hotel per day was $104.
How much did she spend, in **rands**, for five days? (3)

2.2 Mr Zungu from Sparks Estate Secondary takes out a loan to buy furniture for his office. The loan is repaid in ONE payment of R189 389,80 at the end of 4 years. The interest paid on the loan is 10% p.a. compounded annually. Calculate the amount of money borrowed from the bank to buy furniture. (4)

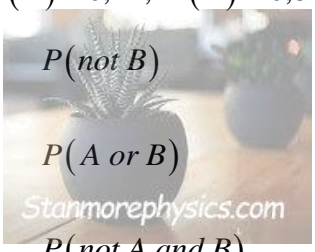
[7]

QUESTION 3

3.1 Given: $P(A)=0,4$; $P(B)=0,5$ and $P(A \text{ and } B)=0,25$. Determine the:

3.1.1 $P(\text{not } B)$ (1)

3.1.2 $P(A \text{ or } B)$ (2)



3.1.3 $P(\text{not } A \text{ and } B)$ (3)

3.2 In a school of 70 Grade 10 learners, 32 learners take Economics (E), 43 take Mathematics (M) and 15 learners take neither of these two subjects.
Let the number of learners who take both subjects be x.

3.2.1 Show that $x=20$. (3)

3.2.2 Draw a Venn diagram to illustrate the above information. (3)

3.2.3 Determine the probability of a learner taking:

(a) Economics and Mathematics. (2)

(b) at least ONE of the two subjects. (2)

(c) taking EXACTLY ONE subject. (2)

3.2.4 The probability that a Mathematics learner is also a Physical Sciences learner is 79%. Determine the number of learners that take Physical Sciences. (3)

[21]

QUESTION 4

At a School Athletics Day, a stopwatch was used to find the time it took a group of athletes to run the 200m event. The results were recorded in a frequency table below.

Class intervals (time in seconds)	Frequency (number of athletes)
$20 \leq x < 30$	6
$30 \leq x < 40$	16
$40 \leq x < 50$	21
$50 \leq x < 60$	8

4.1 How many athletes ran the 200m event? (1)

4.2 Calculate the estimated mean. (4)

4.3 What is the modal class interval (1)

4.4 Identify in which class interval the thirtieth $\left(30^{th}\right)$ percentile lies. (2)

4.5 Represent the data on a histogram, using the attached DIAGRAM SHEET. (3)

[11]

QUESTION 5

The following Life Sciences marks, for a test out of 50, were recorded from 15 grade 10 learners at a certain school.

10	13	15	17	18	20	23	24	26	28	28	29	39	48	49

5.1 Write down the median. (1)

5.2 Determine:

5.2.1 The mean of the data. (2)

5.2.2 The range. (1)

5.2.3 The interquartile range. (3)

5.3 Draw a box and whisker diagram to represent the data above. (3)

5.4 The pass mark for the Life Sciences test was 30%. How many learners passed? (2)

[12]

QUESTION 6

6.1 Given: $f(x)=2\sin x+1$ and $g(x)=\tan x$, where $x\in[0^\circ;270^\circ]$

6.1.1 Write down the:

(a) period of g. (1)

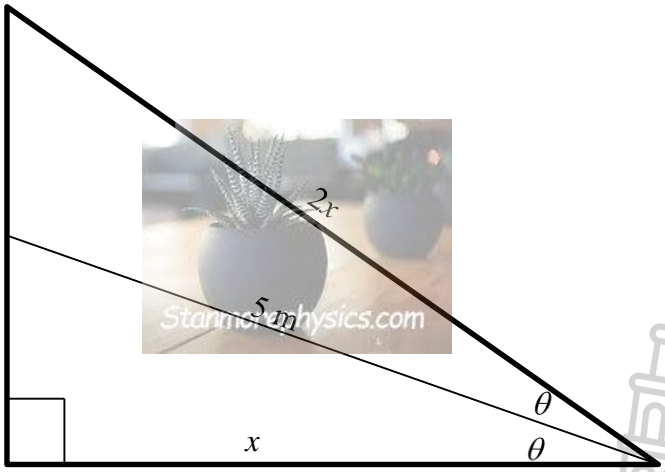
(b) range of f. (2)

6.1.2 On the same set of axes provided on the DIAGRAM SHEET, sketch the graphs of f and g. Clearly indicate all intercepts with the axes, as well as turning points and end points of the graphs. (4)

6.1.3 Determine the value(s) of x where $g(x)\geq 0$. (2)

6.2 A handy man attempts to reach the roof of a hall with a ladder 5 metres in length. Unfortunately, the ladder is too short, and a new ladder will be required. Suppose that the length of the ladder needed to reach the top has to be double the distance from the foot of the ladder to the wall. Also, the angle between his current ladder and the ground will need to be equal to the angle between the two ladders.

The above situation is depicted in the diagram below.



6.2.1 Calculate the value of θ. (3)

6.2.2 If $\theta=30^\circ$, determine what the length of the ladder should be, to get the handy man to the roof. (4)

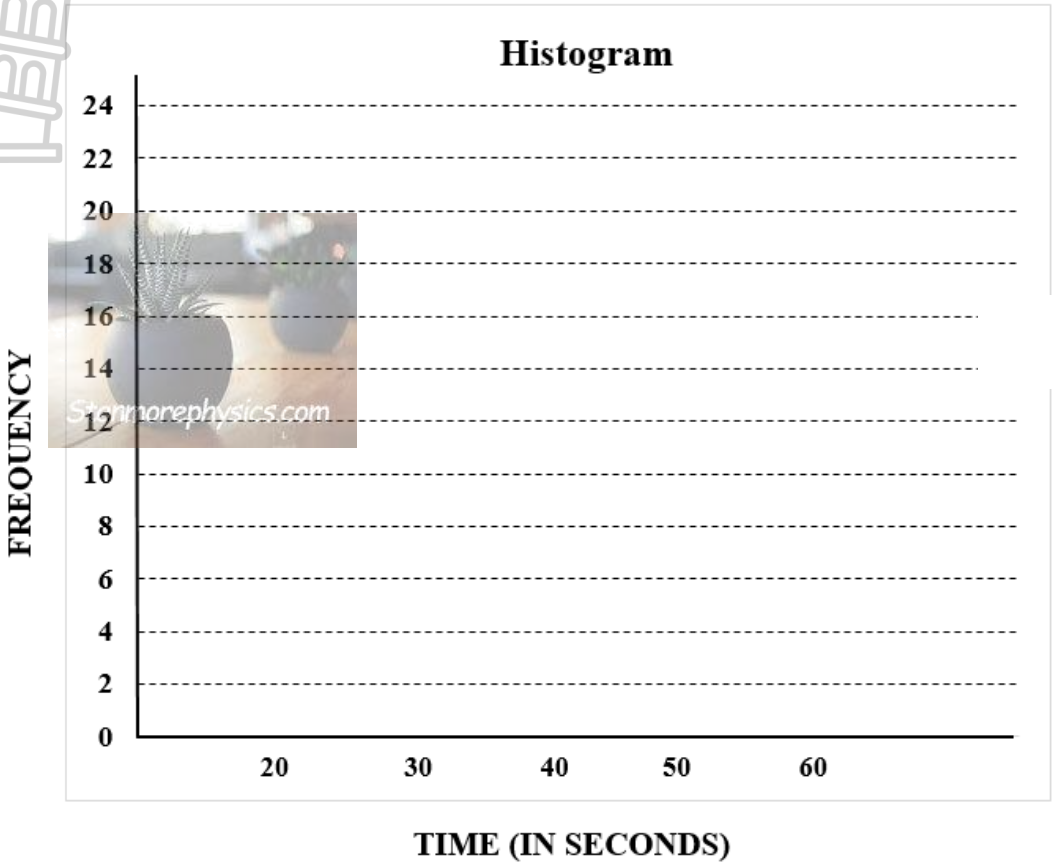
[16]

TOTAL: [75]

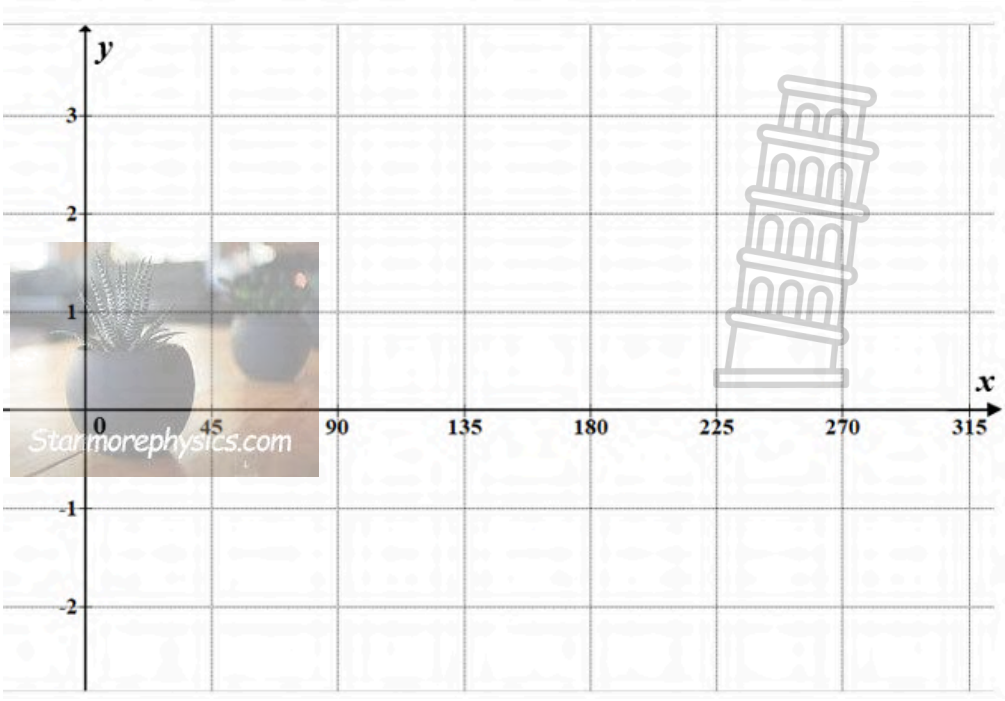
DIAGRAM SHEET

Learner's Name : _____

QUESTION 4.5



QUESTION 6.1.2



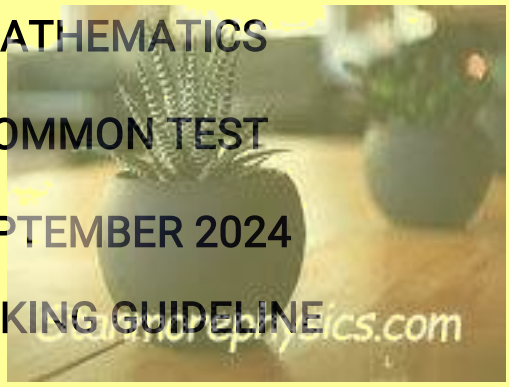
KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

MATHEMATICS

COMMON TEST

SEPTEMBER 2024

MARKING GUIDELINE



NATIONAL SENIOR CERTIFICATE

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This marking guideline consists of 5 pages.

QUESTION 1

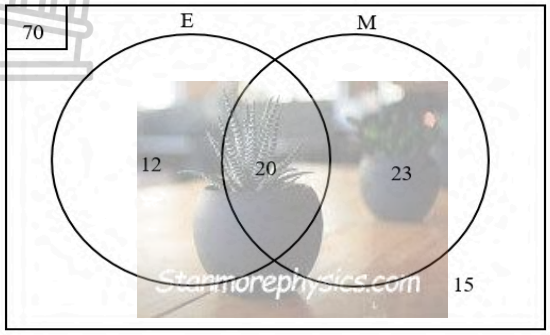
1.1	Total amount $= R1029 \times 36$ $= R\,37\,044$	✔Answer	(1)
1.2	$A = P(1 + i \times n)$ $37044 = P(1 + 0,082 \times 3)$ $P = R29730,34$	✔formula ✔substitution ✔answer	(3)
1.3	$A = P(1+i)^n$ $31968,11 = 29730,34(1+i)^3$ $i = \sqrt[3]{\frac{31968,11}{29730,34}} - 1$ $i = 2,45\%\ p.a$	✔formula ✔substitution ✔ $i = \sqrt[3]{\frac{31968,11}{29730,34}} - 1$ ✔answer	(4)
			[8]

QUESTION 2

2.1	\$1 = R 18,73 \$104 = x $x =$ R 1 947,92 per day total spending = R 9 739,6	✔✔R 1 947,92 ✔answer	(3)
2.2	$A = P(1+i)^n$ $189\,389.80 = P(1+0,1)^4$ P = R 129 355,78	✔formula ✔✔ substitution ✔answer	(4)
			[7]

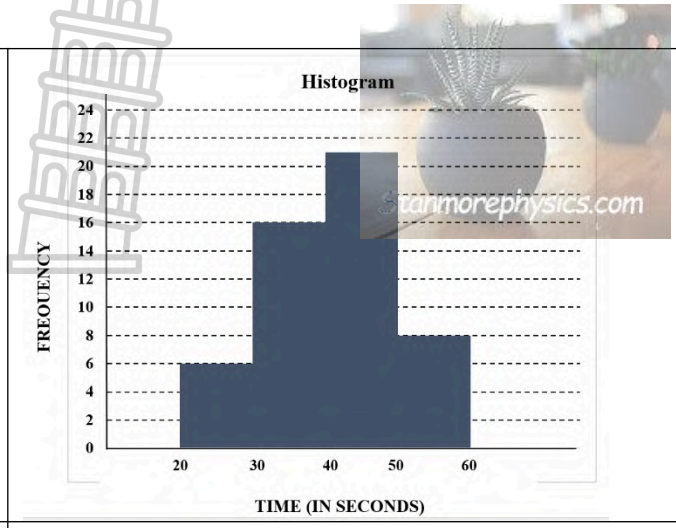
QUESTION 3

3.1.1	P(not B) = 0,5	✔answer	(1)
3.1.2	P(A or B) = P(A) + P(B) − P(A and B) = 0,4 + 0,5 − 0,25 = 0,65	✔formula ✔answer	(2)
3.1.3	P(not A and B) = 0,5 − 0,25 = 0,25	✔✔0,5 − 0,25 ✔answer	(3)

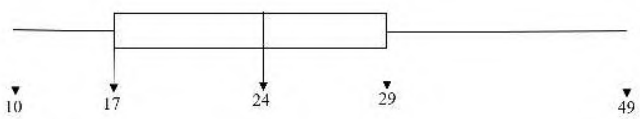
3.2	$32-x+x+43-x+15=70$ $x=20$	✔$32-x+x+43-x+15$ ✔equating to 70 ✔answer	(3)
3.2.2		✔12 ✔20 ✔23 ✔15	(4)
3.2.3	(a) $P(E \text{ and } M)=\frac{20}{70}=\frac{2}{7}=0,29$	✔✔answer	(2)
3.2.3	(b) $P(\text{At least one})=\frac{55}{70}=\frac{11}{14}=0,79$	✔✔answer	(2)
3.2.3	(c) $P(\text{Exactly one})=\frac{12+23}{70}=\frac{35}{70}=\frac{1}{2}=0,5$	✔✔answer	(2)
3.2.4	Physical science $=43\times 79\%$ $=33,97$ ≈ 34 learners	✔✔ $43\times 79\%$ ✔answer **Answer only: full marks**	(3)
			[21]

QUESTION 4

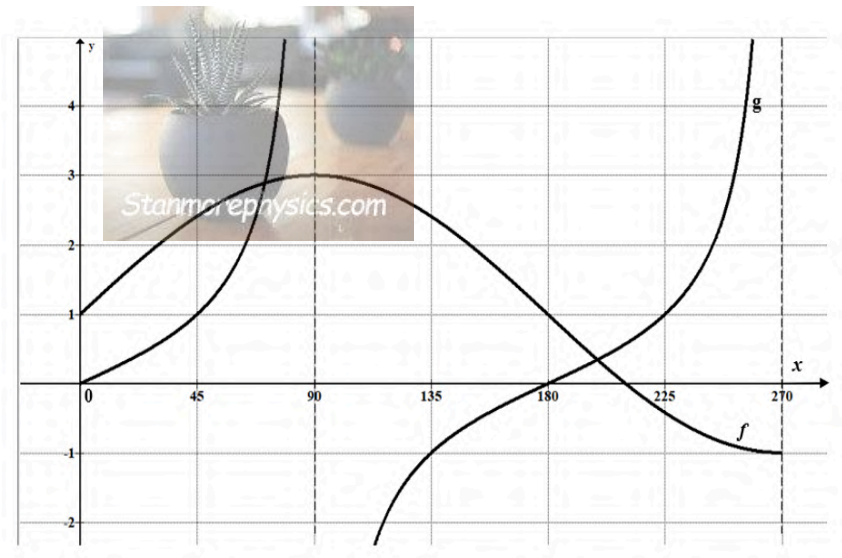
4.1.	51 athletes	✔answer	(1)
4.2	$\text{Mean}(\bar{x})=\frac{(6\times 25)+(16\times 35)+(45\times 21)+(55\times 8)}{51}$ $=\frac{2095}{51}$ $=41,08$	✔numerator ✔denominator ✔ 2095 ✔answer	(4)
4.3	$40 \le x < 50$	✔answer	(1)
4.4	$30 \le x < 40$	✔✔answer	(2)

4.5		✔ 20-40 ✔40-50 ✔50-60	(3)
			[11]

QUESTION 5

5.1	Median = 24	✔ answer	(1)
5.2.1	$\text{Mean} = \frac{387}{15}$ $= 25,8$	✔$\frac{387}{15}$ ✔answer **Answer only: full marks**	(2)
5.2.2	range $= 49 - 10$ $= 39$	✔answer	(1)
5.2.3	IQR $= 29 - 17$ $= 12$	✔✔29 −17 ✔answer	(3)
5.3		✔ 10 and 49 ✔24 ✔17 and 29	(3)
5.4	$\frac{15}{50}$ is the pass mark. ∴13 learners passed.	✔pass mark ✔answer **Answer only: full marks**	(2)
			[12]

QUESTION 6

6.1.1	a) Period = $180°$	✔answer	(1)
6.1.1	b) Range : $y \in [-1; 3]$ **OR** Range: $-1 \leq y \leq 3$	✔notation ✔values	(2)
6.1.2		✔shape of f ✔shape of g ✔asymptotes of g ✔turning point of f	(4)
6.1.3	$0° \leq x < 90°$ **OR** $180° \leq x < 270°$	✔ $0° \leq x < 90$ ✔ $180° \leq x < 270°$	(2)
6.2.1	$\cos 2\theta = \frac{x}{2x} = \frac{1}{2}$ $2\theta = 60°$ $\theta = 30°$	✔ $\cos 2\theta = \frac{x}{2x} = \frac{1}{2}$ ✔ $2\theta = 60°$ ✔answer	(3)
6.2.2	$\cos 30° = \frac{x}{5}$ $x = 4,33$ Length of the ladder = 8,66m	✔✔ $\cos 30° = \frac{x}{5}$ ✔value of x ✔answer	(4)
			[15]
		TOTAL:	[75]