

NAME..... Index
number.....ADM NO.....

Candidate's signature..... Date.....

121/2

FORM 4

MATHEMATICS

PAPER 2

2¹/₂ HOURS



GOLDLITE EXAMINATIONS

FORM 4 JUNE 2022 PRE-MOCKS



Instructions to candidates

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- This paper consists of **two** sections I, II.
- Answer **all** the questions in section **1** and **any five** questions from section II.
- All working and answers **must** be written on the question paper in the spaces provided below each question.
- Show **all** steps in your calculations, giving answers at each stage in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used.
- This paper consists of 13 printed pages.**
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

For Examiner's Use Only.

SECTION I

Questions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
marks																	

SECTION II

1 FOR MARKING SCHEMES INBOX 0724351706

Grand

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Questions	17	18	19	20	21	22	23	24	Total
Marks									
17									

SECTION 1 (50MARKS)

1. Use logarithms to evaluate

(4mks)

$$4 \quad \frac{(0.8932)^2 \times (582.3)^{1/3}}{(69.35)}$$

2. A rectangular card measures 5.3cm by 2.5cm. find

a) The absolute error in the area of the card.

(2mks)

b) The relative error in the area of the card

(2mks)

3. Solve the equation

(4mks)

$$\sin(2x + 10)^\circ = -0.5 \text{ for } 0^\circ \leq x \leq 360^\circ$$

4. In a transformation, an object with an area of 52cm^2 is mapped onto an image whose area is 30cm^2 . Given that the matrix of the transformation is $\begin{pmatrix} x & x-1 \\ 2 & 4 \end{pmatrix}$ find the value of x (3mks)

5. Simplify $\sqrt{48}$ leaving your answer in the form of $a\sqrt{b} + c$ where a, b and c are integers. (3mks)

$$\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} + \sqrt{3}}$$

6. A customer deposited sh 14000 in a saving account. Find the accumulated amount after one year if interest was paid at 12% p.a compounded quarterly (3mks)

7. Expand $(1+x)^5$, hence use the expansion to estimate $(1.04)^5$ correct to 4 decimal place (3mks)

8. Find the centre and the radius of circle whose equation is (3mks)

$$x^2 + 4x + y^2 - 5 = 0$$

9. Make d the subject of the formula

(3mks)

$$P = \frac{\frac{1}{2}mn^2 - gd^2}{n}$$

10. In what proportion should grades of sugar costing sh 45 and sh 50 per kg be mixed in order to produce a blend worth sh 48 per kg

(3mks)

11. Simplify the expression

(3mks)

$$\frac{16m^2 - qn^2}{4m^2 - 2mn - 3n^2}$$

12. Find the equation of the tangent to the curve

(3mks)

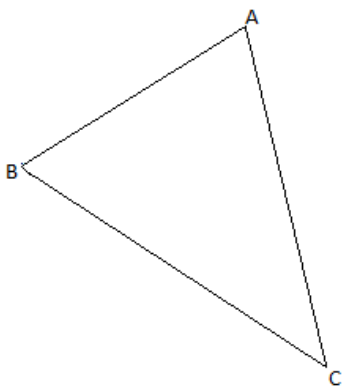
$$y = 2x^2 \text{ at } (2, 3)$$

13. Use matrix method to solve the given simultaneous equation
(3mks)

$$\begin{aligned} 3x+y &= 7 \\ 5x+2y &= 12 \end{aligned}$$

14. The sum of n terms of the sequence 3, 9, 15, 21 ... is 7500. Determine the value of n (3mks)

15. The figure below (not drawn to scale) shows a triangle ABC in which $AB=6\text{cm}$, $BC=9\text{cm}$, $AC=10\text{cm}$. calculate the radius of the circle touching the three vertices of the triangle. (3mks)



16. The point p (40°S , 45°E) and point Q (40°S , 60°W) are on the surface of the earth. Calculate the shortest distance along a circle of latitude between the two points. (3mks)

SECTION B (ANSWER ANY FIVE QUESTION (50 MARKS))

17. The table below shows monthly income tax rates.

Monthly taxable pay K£	Rate of tax sh per K£
1-342	2
343-684	3
685-1026	4
1027-1368	5
1369-1710	6
Over 1710	7

A civil servant earns a monthly salary of sh 20 000 and is provided with a house at a normal rent of sh 700 per month.

a) calculate the civil servant taxable pay in K£
(4mks)

b) Calculate the total tax (4mks)

c) If the employee is entitled to a tax relief of sh 600 per month. What is the net tax paid?
2mks)

18. In an agricultural research centre, the length of a sample of 50 maize cobs were measured and recorded as shown in the frequency distribution table below.

Length in cm	Number of cobs
8-10	4
11-13	7
14-16	11
17-19	15
20-22	8
23-25	5

Calculate

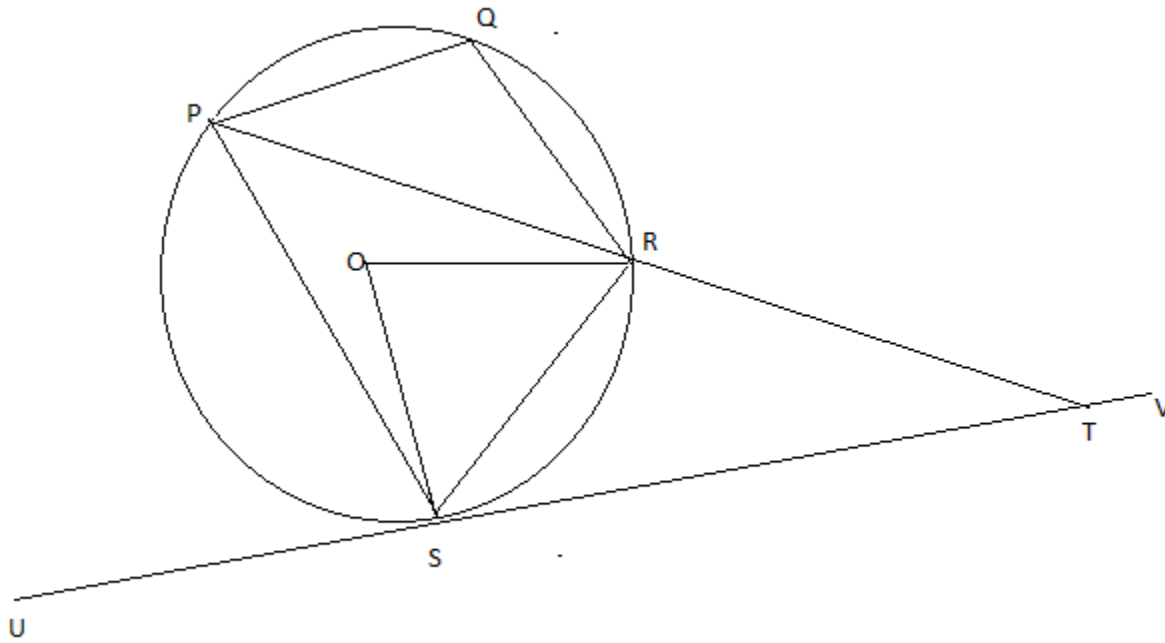
a) The mean

(2mks)

b) (i) the variance
(5mks)

(ii) The standard deviation
(3mks)

19. In the diagram shown below O is the centre of the circle, angle $\angle RTV = 150^\circ$, and angle $\angle RST = 50^\circ$.



a) Calculate the size of

- i. $\angle ORS$
(2mks)

- ii. $\angle USP$

(1mk)

- iii. $\angle PQR$
(2mks)

b) Given that $RT = 7\text{cm}$ and $ST = 9\text{cm}$, calculate to 3.s.f

- i. The length of line PR

(2mks)

ii. The radius of the circle
(3mks)

20. The position of two towns A and B on the earth surface are $(36^{\circ}\text{N}, 49^{\circ}\text{E})$ and $(36^{\circ}\text{N}, 131^{\circ}\text{W})$ respectively

a) Find the difference in longitude between town A and town B
(2mks)

b) Given that the radius of the earth is 6370km calculate the distance between town A and B
(4mks)

(c) Another town C is 840km east of town B and on the same latitude as towns A and B. find the longitude of town C
(4mks)

21. The distance s m from a fixed point O , covered by a particle after t s is given by the equation

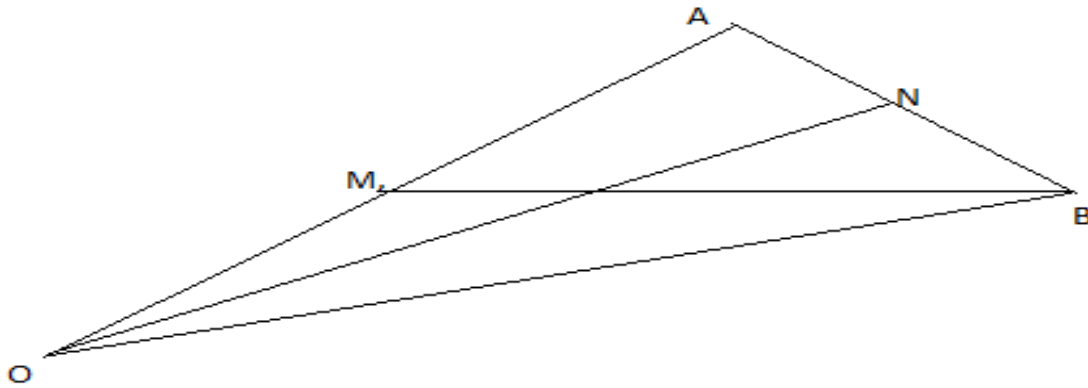
$$S=t^3-6t^2+9t+5$$

a) Calculate the gradient to the curve at $t=0.5$ s
(3mks)

b) Determine the values of s at the maximum and minimum turning points of the curve.
(4mks)

c) On the space provided sketch the curve of $s=t^3-6t^2+9t+5$
(3mks)

22. In the figure below $OQ = a$ and $OB = b$. M is the midpoint of OA and $AN:NB = 2:1$



a) Express in terms of a and b

- i. BA (1mk)
 - ii. BN (1mk)
 - iii. ON (2mks)
- b) Given that $BX = hBM$ and $OX = kON$ determine the values of h and k (6mks)

23. (a) Complete the table below, giving the values correct to 1 d.p
(2mks)

		x°	0	40	80	120	160	200	240
$2\sin(x+20)^\circ$		0.7			2.0		0.0		-2.0
$\sqrt{3}\cos x$		1.7	1.3			-0.9		-1.6	

- (b) On the grid provided, using the same scale and axes, draw the graphs of $y=2\sin(x+20)^\circ$ and $y=\sqrt{3}\cos x$ for $0 \leq x \leq 240^\circ$

(5mks)

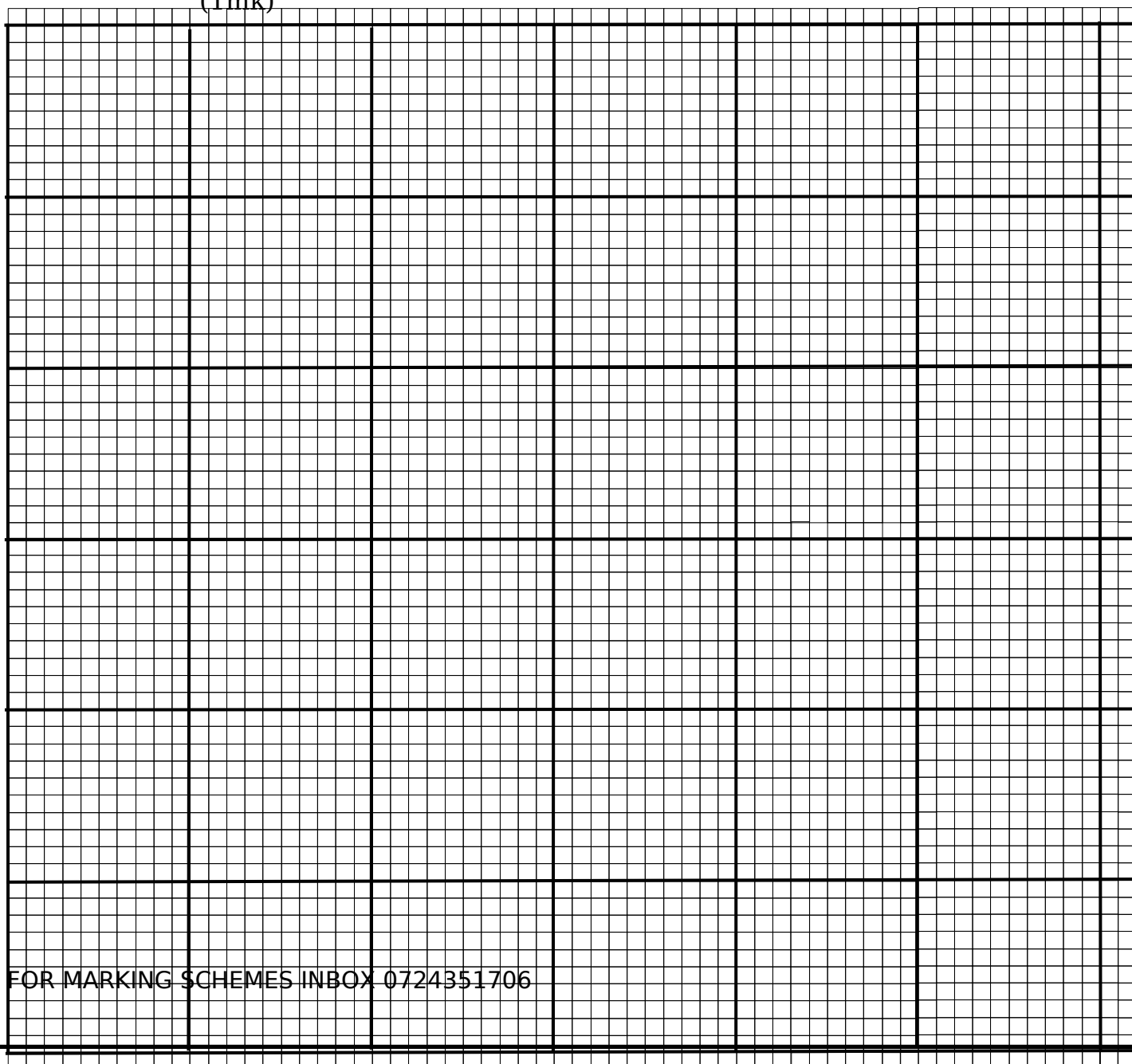
- (c) Use the graphs drawn in (b) above to determine:

- i. The values of x for which $2\sin(x+20)^\circ = \sqrt{3}\cos x$

(2mks)

- ii. The difference in the amplitudes of $y=2\sin(x+20)^\circ$ and $y=\sqrt{3}\cos x$

(1mk)



24. The probabilities that a husband and wife will be a live 25 years from now are 0.7 and 0.9 respectively. Find the probability that in 25 years time;

a) Both will be a live
(2mks)

b) Neither will be a live
(3mks)

c) One will be a live
(2mks)

d) At least one will be a live
(3mks)