

NAME..... ADM NO.....

SCHOOL..... CANDIDATES SIGN.....

DATE

121/2
MATHEMATICS
FORM 3
END OF TERM THREE
TIME: 2 HOURS

END OF TERM (III) EXAMINATION -2019

Kenya Certificate of Secondary Education (K.C.S.E)

121/2

MATHEMATICS

FORM 3

END OF TERM THREE

TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATES

- a) Write your name, Admission number and index number in the spaces provided at the top of this page.
- b) This paper consists of two sections I and Section II
- c) Answer ALL questions from section I and ANY FIVE from section II
- d) All answers and workings must be written on the question paper in the spaces provided below each question.
- e) Show all the steps in your calculation, giving your answer at each stage in the spaces below each question
- f) Marks may be awarded for correct working even if the answer is wrong.
- g) Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.
- h) Non — Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise .
- i) Candidates should answer the questions in English.

SECTION II

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

SECTION II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

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SECTION I (50MARKS)

Answer all the questions in this section

1. Use the logarithm tables to evaluate

(4mks)

$$\sqrt[3]{\frac{36.72 \times (0.42)^2}{185.4}}$$

2. Make m the subject of the formula

(3mks)

$$x = \sqrt{\frac{am^2}{a^2 - m^2}}$$

3. Find the percentage error when 0.87 is truncated to 1 d.p

(3mks)

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4. A man invested Kshs. 24,000 in an account which pays 16% interest p.a. compounded quarterly. Find the amount in the account after $1\frac{1}{2}$ years, to the nearest shilling (3mks)

5. Rationalize the denominator leaving your answer in the form $a + b\sqrt{c}$ where a, b and c are constants. (3mks)

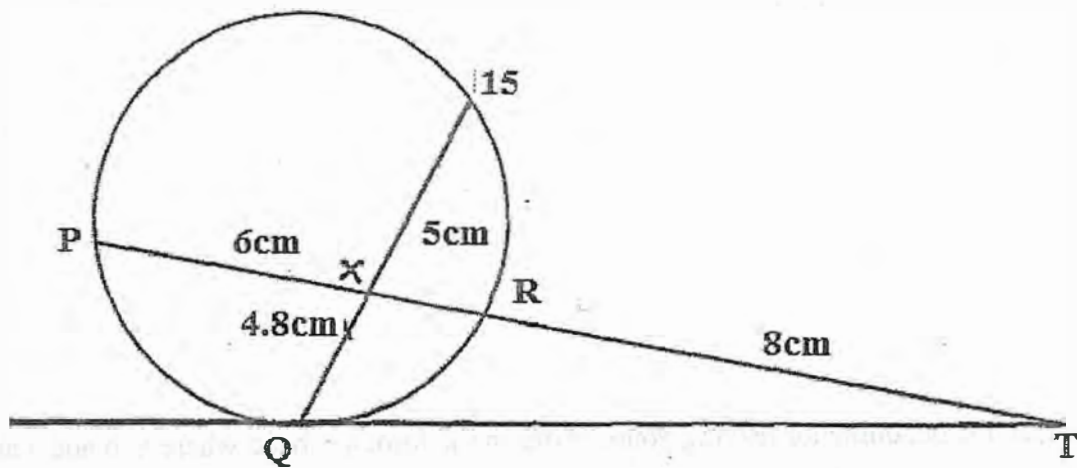
$$\frac{5 - 2\sqrt{3}}{2 + 3\sqrt{3}}$$

6. Three quantities X, Y and Z are such that X varies directly as the square root of Y and inversely as the fourth root of Z. when $X = 64$, $Y = 16$ and $Z = 625$. Determine the equation connecting X, Y and Z (3mks)

7. In the figure below QT is a tangent to the circle at Q. PXRT and QXS are straight lines.

PX=6cm, RT = 8cm, QX = 4.8cm, X S = 5cm

Find the length of QT



8. A chord AB of length 15cm subtends an angle of 65° at the circumference of circle. Find the radius of the circle (3mks)

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9. Solve the equation $\sin \theta = -0.8$ for $0^\circ \leq \theta \leq 360^\circ$ (3mks)

10. Find the inverse of the matrix $\begin{pmatrix} 4 & 2 \\ 1 & -6 \end{pmatrix}$ hence solve the equation (3mks)

$$4x + 2y = 10$$

$$x - 6y = 9$$

11. Simplify completely (3MRSK)

$$\frac{3x^2 - 5xy - 2y^2}{y^2 - 9x^2}$$

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12. Find the centre of enlargement that would map P (2, -3) onto P¹(5, 6) with the scale factor 2

(3mks)

13. Solve for x in the equation

$$\log_{10}(3x + 2) - 1 = \log_{10}(x - 4)$$

(3mks)

14. A circle has the equation

$$\frac{1}{2}x^2 + \frac{1}{2}y^2 + 5y - 4x + \frac{5}{2} = 0$$

Find the radius and the centre coordinate of the circle

(3mks)

15. Three types of coffee A, B and C are mixed in the ratio 7:2:3 respectively. The cost per packet is shs. 110, 155 and sh. 120 respectively. If the mixture is sold at a profit of shs. 25%. Calculate the selling price of the mixture per packet (3mks)



16. a) Obtain the binomial expansion for $(x + \frac{2}{x})^4$ (2mks)

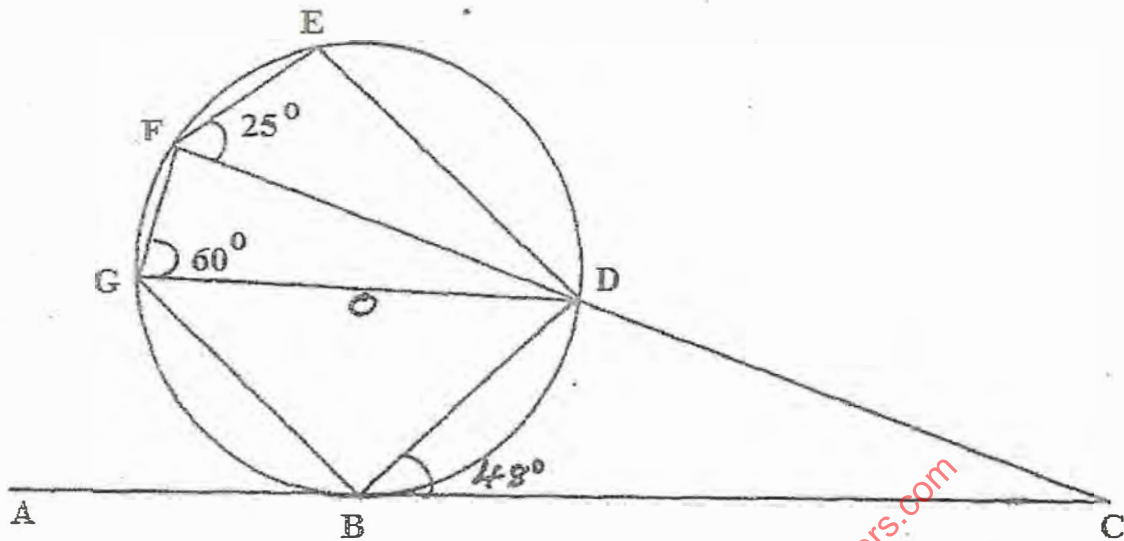
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- b) Use the expansion in (a) above to estimate $(10.2)^4$ correct to 2 significant figures (2mks)

SECTION II (50 MARKS):

Answer all the question in this section

17.



In the figure above ABC is a tangent to the circle centre O. DOG is a diameter and $\angle DGF = 60^\circ$, $\angle DBC = 48^\circ$ and $\angle DFE = 25^\circ$. Giving reasons find the size of the following angles

(i) FED (2mks)

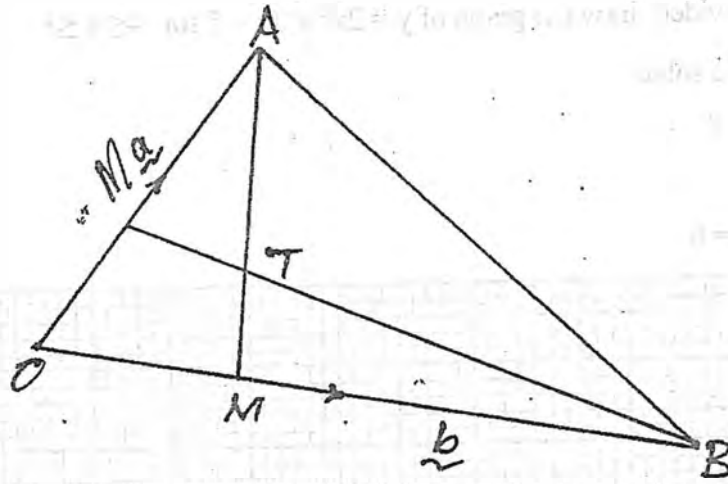
(ii) Obtuse FOB (2mks)

(iii) EBD (2mks)

(iv) BCD (2mks)

(v) OBE (2mks)

18. The figure below shows triangle OAS in which $OA = a$ and $OB = b$. M is a point on OB such that $OB = 3 OM$ and N is a point on OA such that $ON = \frac{1}{4} OA$. BN meets AM at T.



a) Find in terms of a and b

(i) \vec{AB}

(1mk)

(ii) \vec{BN}

(1mk)

(iii) \vec{AM}

(1mk)

b) Given that $BT = hBN$ and $AT = kAM$ where h and k are scalars, express AT in two different ways and hence find the value of h and k (6mks)

Find the ratio $AM:MT$

19. Complete the table below using the function $y = 2x^2 + 3x - 5$ in the range $-4 \leq x \leq 5$ (2mks)

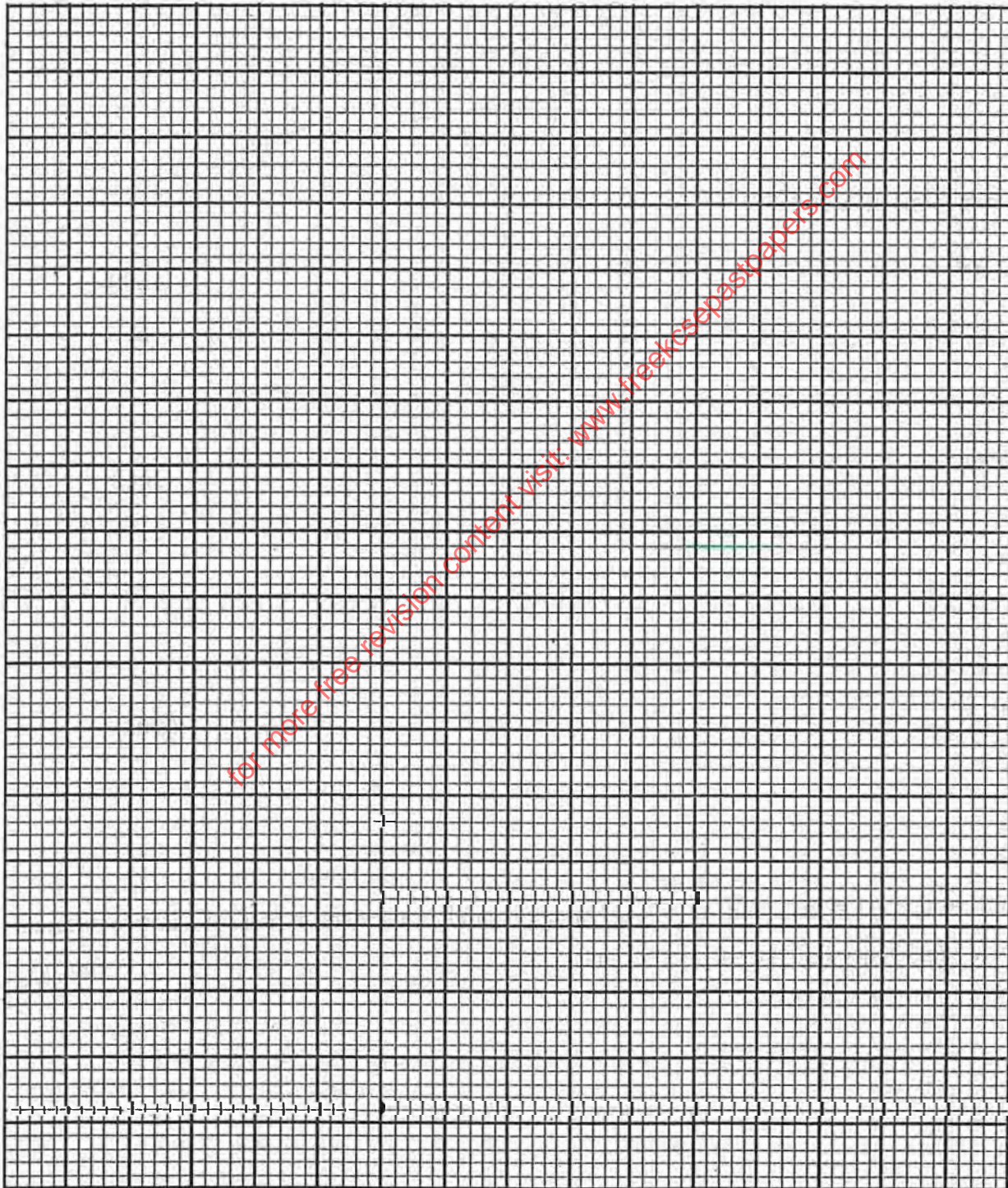
x	-4	-3	-2	-1	0	1	2	3	4	5
y										

a) On the grid provided draw the graph of $y = 2x^2 + 3x - 5$ for $-4 \leq x \leq 5$ (3mks)

b) Use the graph to solve

$-2x^2 - 9x + 3 = 0$ (3mks)

$-2x^2 + 3x + 15 = 0$ (2mks)



20. In a form 3 class there are 22 girls and 18 boys. The probability that a girl completes the secondary education course is $\frac{3}{5}$ whereas that of a boy is $\frac{2}{3}$. A student is picked at random from the class. Find the probability that the student picked:

a) (i) is a boy and will complete the course (2mks)

(ii) will complete the course (2mks)

(iii) is a girl and will not complete course (2mks)

b) A bag contains 5 blue balls, 8 red balls and 3 green balls being similar in shape and size. A ball is picked out at random without replacement and its colour noted. Use a tree diagram to determine the probability that at least one of the first two balls picked is green (4mks)

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21. a) The first term of an AP=2. The sum of the first 8 terms of the AP is 156. Find the common difference of the AP. (3mks)

b) The 3rd, 5th and 8th term of another AP form the first 3 consecutive terms of a GP. If the common difference of the AP = 3. Find the first term of the GP. (4mks)

c) A group of insects were noted to double every 3days. Initially, there, were 120 insects, find the total number of insects after 30days. (3mks)