

Name.....
Candidates signature.....

Index Number.....

Date.....

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2010
2 ½ Hours

FORM 4 MID YEAR CONTINUOUS ASSESSMENT TEST
MATHEMATICS
PAPER 1
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided
- (c) This paper consists of two sections. Section I and section II.
- (d) Answer **ALL** the questions in section I and **only** five questions from section II.
- (e) All answers and working must be written on the question paper in the spaces provided below each question.
- (f) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- (g) Marks may be given for correct working even if the answer is wrong
- (h) Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

FOR EXAMINER'S USE ONLY

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

17	18	20	21	22	23	Total

Grand Total

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This paper consists of 16 printed pages

Turn over

SECTION I 50 MARKS

Answer all the questions in this section in the spaces provided.

(3 marks)

1. Evaluate
$$\frac{-4 \text{ of } (-4 + -5 \div 15) + -3 - 4 \div 2}{84 \div -7 + 3 - -5}$$

2. Solve for x given

$$\left(\frac{1}{8}\right)^x \cdot 64^2 = 256$$

(3 marks)

3. The gradient of a line L through points A(2x,4) and B(-1,x) is $\frac{1}{7}$. Find the equation of a line perpendicular to L through B. (3 marks)

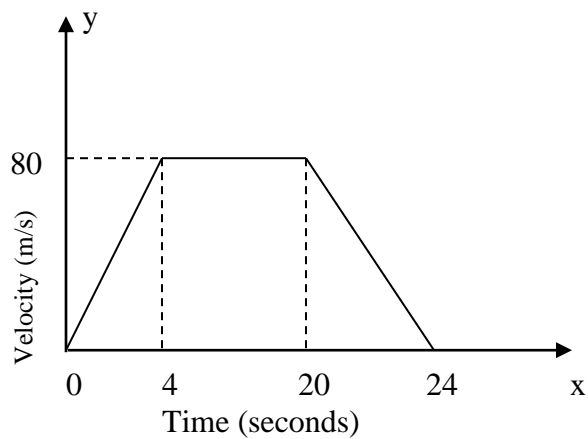
4. The position vectors of A and B are $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and $\begin{pmatrix} 8 \\ -7 \end{pmatrix}$ respectively. Find the coordinates of M which divides AB in the ratio 1:2. (3 marks)

5. Solve the inequality $\frac{1}{2}x - 2 \leq 3x - 2 < 2 + \frac{1}{2}x$ and state the integral values which satisfy this inequalities. (3 marks)

6. Two similar cans have different heights 8cm and the other one 10cm. If the surface area of the larger can is 480cm^2 , find the surface area of the smaller can. (3 marks)

7. Given that $\cos \theta = \frac{5}{13}$ and that $270^\circ \leq \theta \leq 360^\circ$, work out the value of $\tan \theta + \sin \theta$ without using a calculator or mathematical tables. (3 marks)

8. The figure below is a velocity time graph for a car.



- (a) Find the total distance traveled by the car. (2 marks)

- (b) Calculate the deceleration of the car. (2 marks)

9. Simplify the expression

(3 marks)

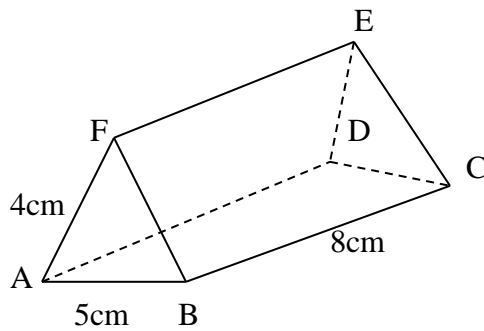
$$\frac{p^2 - 4m^2}{2m^2 - 7mp + 3p^2}$$

10. During a certain ceremony goats and chicken were slaughtered. The number of heads (for both chicken and goats) was 45. The total number of legs was 100. Determine the exact number of goats and chicken slaughtered. (3 marks)

11. The exterior angle of a regular polygon is an eighth of the interior angle. How many sides does the regular polygon have? (3 marks)

12. A man imported a vehicle at Shs. 600,000 and sold it at Sh. 1,080,000. Find his percentage profit if he spent sh. 60,000 for clearing the vehicle from the port and a further sh. 40,000 for shipping. (3 marks)

13.



The figure above is a triangular prism of uniform cross-section in which $AF = 4\text{cm}$, $AB = 5\text{cm}$ and $BC = 8\text{cm}$.

- (a) If angle $BAF = 30^\circ$, calculate the surface area of the prism. (3 marks)

- (b) Draw a clearly labeled net of the prisms. (1 mark)

14. A Kenyan tourist left Germany for Kenya through Switzerland. While in Switzerland he bought a watch worth 52 Deutsche marks. Find the value of the watch in:-

(a) Swiss Francs

(b) Kenya shillings

(3 marks)

Use the exchange rates below

1 Swiss Franc = 1.28 Deutsche marks

1 Swiss Franc = 45.21 Kenya shillings

15. The sides of a parallelogram are 4cm by 5cm and its area is 12cm^2 . Calculate its angles. (3 marks)

16. From a point 20m away on a level ground the angle of elevation to the lower window line is 27° and the angle of elevation to the top line of the window is 32° . Calculate the height of the window.

(3 marks)

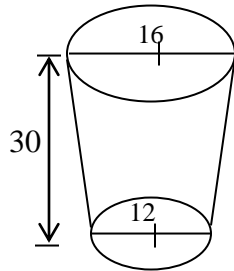
SECTION II (50 MARKS)

Answer any five questions in this section in the spaces provided.

17. A bucket is in the shape of a frustum with base radius 12cm and top radius 16cm. The slant height of the bucket is 30cm as shown below. The bucket is full of water.

(a) Calculate the volume of the water. (Take $\pi = 3.142$)

(6 marks)



(b) All the water is poured into a cylindrical container of circular radius 12cm. If the cylinder has height 45cm, calculate the surface area of the cylinder which is not in contact with water.

(4 marks)

18. (a) Draw the graph of
 $y = 2x^2 - x - 3$ for $-3 \leq x \leq 3$

(5 marks)

- (b) Using a suitable line solve
 $2x^2 - 3x - 50 = 0$

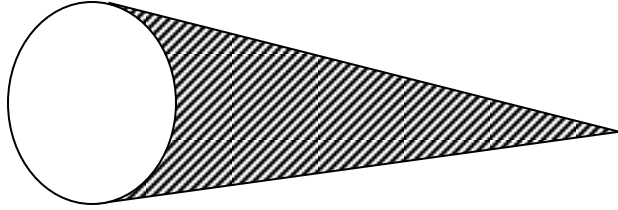
(5 marks)

19. Using a pair of compasses and ruler only;

- (a) Construct triangle ABC such that $AB = 8\text{cm}$, $BC = 6\text{cm}$ and angle $ABC = 30^\circ$. (3 marks)
- (b) Measure the length of AC (1 mark)
- (c) Draw a circle that touches the vertices A,B and C. (2 marks)
- (d) Measure the radius of the circle (1 mark)

(e) Hence or otherwise, calculate the area of the circle outside the triangle. (3 marks)

20. In the figure below AB and AC are tangents to the circle centre O at B and C respectively, the angle $\text{AOC} = 60^\circ$



Calculate

(a) The length of AC

(2 marks)

(b) The area of triangle OAC

(2 marks)

(c) The area of minor sector COD

(2 marks)

(d) The area of the shaded region

(4 marks)

21. John bought 3 brands of tea A,B and C. The cost price of the three brands were Sh. 25, Sh. 30 and Sh. 45 per kilogram respectively. He mixed the three brands in the ratio 5:2:1 respectively. After selling the mixture he made a profit of 20%.

(a) How much profit did he make per kilogram of the mixture? (4 marks)

(b) After one year the cost price of each brand was increased by 12%.

(i) For how much did he sell one kilogram of the mixture to make 20% profit? Give your answer to the nearest 5cts (3 marks)

40.25? (ii) What would have been his percentage profit if he sold one kilogram of the mixture at Sh. (3 marks)

22. A tailor bought a number of suits at a cost of Sh. 57,600 from Ken-suit wholesalers. Had he bought the same number of suits from Umoja wholesalers, it would have cost him Sh. 480 less per suit. This would have enabled him to buy 4 extra suits for the same amount of money.

(a) Find the number of suits the tailor bought

(4 marks)

(b) The tailor later sold each suit for Sh. 720 more than he had paid for it. Determine the percentage profit he made?

(4 marks)

23. (a) An arithmetic progression is such that the first term is -5 , the last is 135 and the sum of progression is 975 .

Calculate

(i) The number of terms in the series.

(7 marks)

(ii) The common difference of the progression

(2 marks)

(b) The sum of the first three terms of a geometric progression is 27 and the first term is 36 . Determine the common ratio and the value of the fourth term. (4 marks)

24. A particle P moves in a straight line such that t seconds after passing a fixed point Q, its velocity is given by the equation $2t^2 - 10t + 12$. find;

(a) The values of t when p is instantaneously at rest (2 marks)

(b) An expression for the distance moved by P after t seconds. (2 marks)

(c) The total distance traveled by P in the first 3 seconds after passing point O. (3 marks)

(d) The distance of P from O when the acceleration is zero. (3 marks)