[MATHEMATICS PAPER 2 QUESTION PAPER](http://revision.co.ke/question-papers/2016-pre-kcse/mathematics-paper-2" \o "Mathematics Paper 2 Question Paper - 2016 Pre KCSE, Free 2016 KCSE Past Papers Kenya, Free Marking Schemes, Download 2016 MOCK Past Papers Kenya, 2016 Revision Book)

2016 Pre KCSE

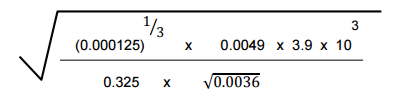
Mathematics Paper 2

SECTION I (50 Marks)

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

1.

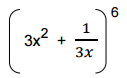
Evaluate without using tables or a calculator



 4 marks

2.

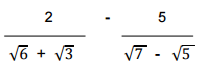
Find the value of the term independent of x in the expansion of



 3 marks

3.

Simplify the following giving your answer in the simplest form possible.



 3 marks

4.

Without using tables or a calculator evaluate

Mathematics Paper 2 Question Paper - 2016 Pre KCSE

 3 marks

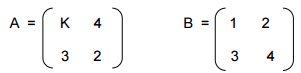
5.

Given that Mathematics Paper 2 Question Paper - 2016 Pre KCSE make c the subject of the formular.

 3 marks

6.

Two matrices A and B are such that

  
Given that the determinant of AB = 4 find the image of triangle ABC where   
A = (2,0) , B (3,2) and C (3,4) under stretch, stretch factor K, parallel to the   
X axis.

 3 marks

7.

a. Find the position vector OC of the centre of a circle C, whose equation is  
2x2 + 2y2 + 4x - 6y - 26 = 0 (2mks)  
b. If the circle passes through P (3, 2), use vector method to find the diameter  
of the circle. (2mks)

 4 marks

8.

The sum of the digits in a three digit number is nine. The tens digit is half the   
sum of the sum of the other two and the hundreds digit is half the units digit.   
Find the total value of the number.

 3 marks

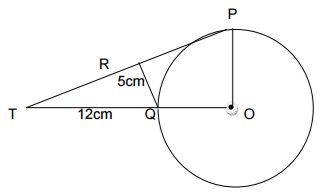
10.

Find the exact area of the region bounded by the curve y = 9x - x3 and the x axis.

 4 marks

11.

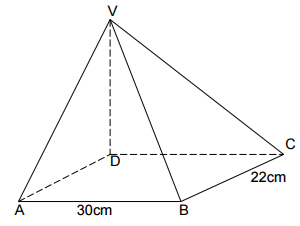
In the figure below, RP and RQ are tangents to the circle centre O, radius r cm. OQ produced meets PR produced at T. QT = 12cm and QR = 5cm

  
Calculate the radius of the circle.

 3 marks

12.

The figure below represents a right pyramid with a vertex V and a rectangular   
base, ABCD. VA = VB = VC = VD = 40 cm.

  
AB = 30cm and BC = 22cm. X is the mid-point of BC.   
Calculate the size of the angle between planes VBC and ABCD

 3 marks

13.

Given that **a** = 3**i**- 2**j**+ 3**k** and  
  
b = 2**i**- 4**j**- 3**k**  
  
Find |2**a** - 3**b**|

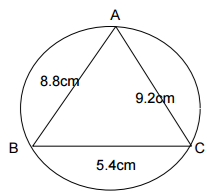
 3 marks

14.

If 25x2 + k + 9 is a perfect square find x

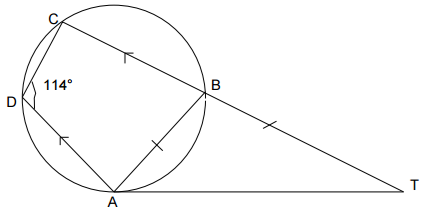
 2 marks

15.

The figure below shows a circle centre O touching the vertices A , B , C  
of triangle AB = 8.8cm , BC = 5.4cm and AC = 9.2cm.  
  
Calculate the radius of the circle to the nearest whole number. (3mks)

 3 marks

16.

XAY is a tangent to the circle ABCD. AD is parallel to the straight line   
CBY . Angle ADC = 114°, and AB = BY   
  
Calculate angles   
i. ABC (1mk)

ii. BCA (1mk)

 2 marks

SECTION II (50 Marks)

**Answer only five question in this section in the spaces provided.**

17.

The following table shows individual rates of income tax

|  |  |
| --- | --- |
| **Income K£** 1 – 4512  4513 - 9024  9025 – 13536  13537 – above | **PA Rate (sh. Per K£)** 2  3  4  5 |

Mr. Kariuki lives in a company house for which he pays a nominal rent of   
Ksh.610 per month. For taxation purpose, his basic salary is increased by   
15%. He is insured and pays sh.1200 as premiums per month and claims   
insurance relief of K£ 36 per annum. He also claims a family relief of sh.660   
per month. In addition, he is a member of a co-operative society, to which he   
remits Ksh.1500 per month, as shares. If Mr. Kariuki’s P.A.Y.E is ksh.2400   
per month, calculate his net salary in shillings per month.

 2 marks

18.

a. Using a ruler and a pair of compasses only construct   
i. Triangle ABC, such that AB = 9cm, AC = 7cm and < CAB = 60° (2mks)   
ii. The locus of P , such that AP ≤ BP (2mks)   
iii. The locus of Q such that CQ ≤ 3.5cm   
iv. Locus of R such that angle ACR ≤ angle BCR (2mks)   
  
b. Find the area of the region satisfied by both P and Q (2mks)

 10 marks

19.

Points D(0° , 24°E) , E(O°, 21°W) , F(60°S, 120°W) , G(60°S, 110°E) are   
marked in a globe representing the earth with radius = 0.7m.   
(Taking π as 22/7 )  
a. Find the length of the arc DE. (3mks)   
b. If A is the centre of the latitude 60°S, and B is the centre of the latitude O° find   
i. the length AB (3mks)   
ii. the area of the major sector AFG (4mks)

 10 marks

20.

In a group of 40 people, 10 are healthy and every person of the remaining 30   
has either high blood pressure, a high level of cholesterol or both. 15 have   
high blood pressure and 25 have high level of cholesterol. If a person is   
selected at random from this group, what is the probability that he/she   
  
a. Has high blood pressure only (4mks)   
b. Has high level of cholesterol only (2mks)   
c.. Has high blood pressure and high level of cholesterol (2mks)   
d. Has either high blood pressure or high level of cholesterol (2mks)

 10 marks

21.

Three consecutive terms in a G.P are 3 2x + 1 , 9x and 81 respectively.   
a. Calculate the value of x (2mks)   
b. Find the common ratio of the series. (2mks)   
c. Calculate the sum of the first 10 terms of the series. (3mks)   
d. Given that the 5th and 7th terms of the G.P in (a) above form the 1st two   
consecutive terms of an A.P Calculate the sum of the 1st 20 terms of the   
A.P. (3mks)

 10 marks

22.

Two variables y and x are believed to be related by the equation   
y = x + ax b. The table below shows the corresponding values of x and y.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 |
| y | 7.54 | 9.33 | 11.00 | 12.59 | 14.12 | 19.90 | 27.23 |

a. By drawing a suitable line graph, estimate the values of a and b. (9mks)

b. Write down the equation connecting y and x. (1mk)

 10 marks

23.

The marks obtained by fifty candidates were recorded in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 - 9 | 10 - 19 | 20 - 29 | 30 - 39 | 40 x 49 | 50 - 59 | 60 - 69 |
| No. of  candidates | ‍ | ‍ | ‍ | ‍ | ‍ | ‍ | ‍ |

a. Draw a cumulative frequency graph and use it to estimate. (3mks)   
i. Median (1mk)   
ii. Quartile deviation (2mks)   
iii. The percentage number of candidates failing if the pass mark was 25 marks.   
(2mks)   
iv. The range of marks scored by the middle 30% of the candidates. (2mks)

 10 marks

24.

A theatre has a seating capacity of 250 people. The changes are sh.100 for   
an ordinary seat and sh.160 for a special seat. It costs sh.16,000 to stage a   
Show and the theatre must make a profit. There are never more that 200   
ordinary seats and for a show to take place, at least 50 ordinary seats must   
be occupied. The number of special seats is always less than twice the   
number of ordinary seats.   
a. Taking x to be the number of ordinary seats and y the number of special   
seats, write down all the inequalities representing the information above.   
(4mks)   
b. On a graph paper, show the region represented by the above inequalities.   
(4mks)   
c. Determine the number of seats of each type that should be booked in   
order to maximize profit. (2mks)

 10 marks

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