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**KENYA NATIONAL EXAMINATION COUNCIL  
REVISION MOCK EXAMS 2016  
TOP NATIONAL SCHOOLS**

**PRECIOUS BLOOD HIGH SCHOOL  
MATHEMATICS  
PAPER 2**

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**PRECIOUS BLOOD KCSE TRIAL  
AND PRACTICE EXAM**

**Paper 2**

- 1 Use logarithms only to evaluate,

$$4\sqrt{\frac{72.36x0.69^2}{\log 1684}}$$

Correct to four significant figures.

(4mks)

- 2 Make 4 the subject of the formula.

$$t = \frac{2m}{n} \sqrt{\frac{L-A}{3k}}$$

(3mks)

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- 3 Express the recurring decimal below as a fraction; 4.372 leaving your answer in the form of  $\frac{a}{b}$  where a and b are integers. (2mks)

- 4 Determine the amplitude, period and the phase angle of the wave represented by the equation.

$$y = \frac{-2}{3} \sin \left( x + 40^\circ \right) \quad (3mks)$$

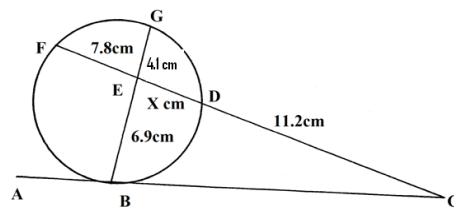
- 5 Given that  $\frac{3}{3+\sqrt{5}} + \frac{3\sqrt{5}}{3-\sqrt{5}} = a+b\sqrt{5}$ . Find the values of a and b (4mks)

- 6 The dimensions of a cuboid are 4.5cm by 3.5cm by 2cm. Find the percentage error in its volume giving your answer to 2 significant figure. (3marks)

- 7 A car was valued at kshs.500,000 in January 2010. Each year its value depreciated at 12% p.a. After how long would the value depreciate to kshs.250,000? (3mks)

- 8 Given that the matrix  $\begin{pmatrix} 5-x & 2 \\ 3x & 4 \end{pmatrix}$  has no inverse, find x. (2mks)

- 9 In the figure below ABC is a tangent to the circle at point B. Given that BE = 6.9cm, FE = 7.8cm, GE = 4.1cm, DC = 11.2cm and ED = xcm. Determine the length BC, give your answer in four significant figures. (4mks)



- 10 Find the radius and the co-ordinates of the centre of the circle whose equation is  $\frac{1}{2}x^2 + \frac{1}{2}y^2 = 3x - 5y - 9$ . (3mks)

- 11 A quantity P varies partly as t and partly as the square of t. When t = 20, p = 45, and when t = 24, p = 60.

a) Express p in terms of t. (2mks)

b) Find p when t = 32. (2mks)

- 12 The position vectors of points A and B are  $a = 2i + j - 8k$  and  $b = 3i + 2j - 2k$  respectively. Find the magnitude of AB. (3mks)

- 13 Write the expression of  $(2 - \frac{1}{5}x)^6$  up to the term in  $x^4$ . Hence use the expansion to find the value of  $(1.96)^6$  correct to 3 decimal places. (4mks)

- 14 Five men working 8 hours daily complete a piece of work in 3 days. How long will it take 12 men working 5 hours a day to complete the same work. (2mks)
- 15 Find the integral values of  $x$  which satisfy  $6 \leq 2x + 1$  and  $5x - 29 < -4$ . (3mks)
- 16 In a fund-raising committee of 45 people, the ratio of men to women is 7 : 2. Find the number of women required to join the existing committee so that the ratio of men to women changes to 5 : 4. (3mks)

**SECTION II (50 MARKS)**

**Attempt any five questions from this section**

- 17 The table below gives the income tax rates.

Income (k£)	Rate (p.a)
1-1980	10%
1981-3960	15%
3961-5940	25%
3941-7920	35%
7921-8650	45%
Over 8651	50%

- a) Calculate income tax of Wanga's taxable income of kshs.50,400 per month allowing a family relief of kshs. 520 per month. (8mks)
- b) Calculate the total tax as a percentage of taxable income (2mks)
- 18 a) Draw  $\Delta PQR$  whose vertices are  $P(1,1)Q(-3,2)$  and  $R(0,3)$  on the grid provided
- b) Find and draw the image of  $\Delta PQR$  under the transformation whose matrix is  $\begin{pmatrix} 3 & 0 \\ 1 & 1 \end{pmatrix}$  and label the image  $P'Q'R'$  (2mks)

$P'Q'R'$  is then transformed into  $P^{11} Q^{11} R^{11}$  by the transformation with the  $\begin{pmatrix} -1 & 0 \\ 1 & 3 \end{pmatrix}$  matrix (2mks)

- c) Find the co-ordinates of  $P^{11} Q^{11} R^{11}$  and draw  $P^{11} Q^{11} R^{11}$  (3mks)
- d) describe fully the single transformation which maps  $PQR$  onto  $P^{11} Q^{11} R^{11}$  find the matrix of this transformation (3mks)
- 19) The probability of passing K.C.P.E depends on performance in the school mock examination. If the candidate passes in mock, the probability of passing K.C.P.E is  $\frac{4}{5}$ . If the candidate fails in mock, the probability of passing K.C.P.E is  $\frac{3}{5}$ . If the candidate passes K.C.P.E, the probability of getting employed is  $\frac{1}{3}$ , the probability of passing mock is  $\frac{2}{3}$ .
- a). Draw a well label tree diagram to represent the above information (2mks)
- b) Use your tree diagram in (a) above to find the probability that she
- i) Passes KCPE exams (2mks)
- ii) Gets employed (2mks)
- iii) Passes KCPE and gets employed (2mks)
- iv) Passes mock and gets employed (2mks)

20. The diagram below shows triangle O.A.B in which N is the mid point of AB. Mis a point on OA such that  $OM :MA=2:1$ . Lines ON and BN meet at X such that vector  $OX=h$  vector ON and  $MX= kMB$

Given that vector  $OA =a$  and vector  $OB=b$

i) Express the following interms of a and b

a) Vector AB (1mk)

b) Vector ON (2mks)

c) Vector BM ( 1mk)

a. By expressing vector OX in two different ways ,determine the values of h and k (6mks)

21). Using a ruler and a compass only

a) Construct a parallelogram ABCD such that  $AB = 10\text{cm}$   $BC=7\text{cm}$  and  $\angle ABC = 105^\circ$  (5mks)

b) Construct the loci of P and Q within the parallelogram such that  $AP < 4\text{cm}$  and  $BQ < 6\text{cm}$  (2mks)

c) Calculate the area within the parallelogram and outside the region bounded by the two loci (3mks)

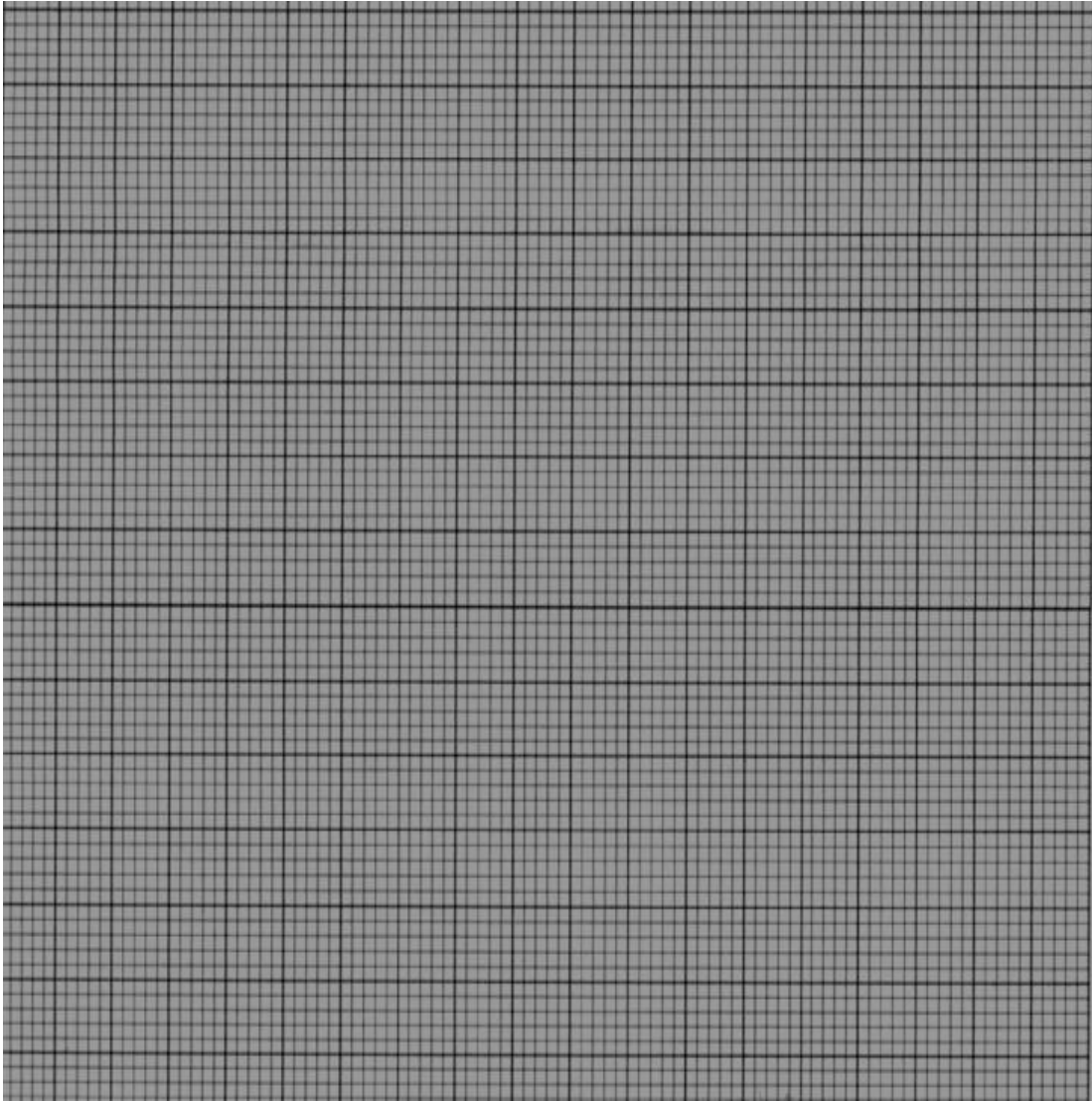
22. a) Complete the table below

x	-30	0	30	60	90	120	150	180	210	240	270
Sin (x+30)	0	0.50		1.00	0.87			-0.50			-0.87
Cos ( x-15)	0.71		0.97		0.26				-0.97	-0.71	-0.26

b) Draw the graph of  $y = \sin (x+30)$  and  $y=\cos(x-15)$  for  $-30 \leq X \leq 270^\circ$  on the same grid. Take 1cm to represent  $30^\circ$  on x-axis and 1cm to represent 0.2units on y-axis.

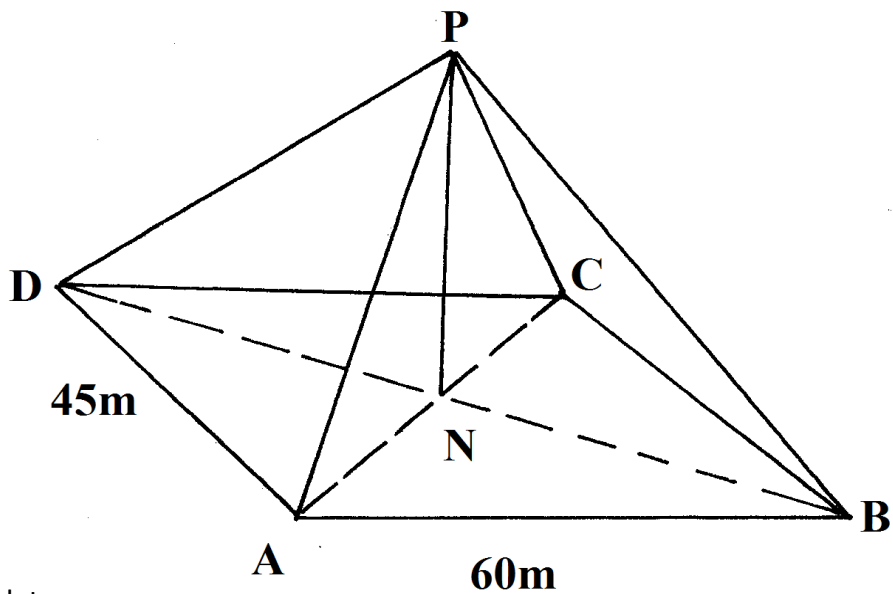
a) Using your graph drawn (b) above

- i) Find the values of  $x$  for which  $\cos(x-15) - \sin(x+30) = 0$  ( 2mks)



- a. State the co-ordinates of the turning point of the curve for the function  $y = \cos(x-15)$  on the negative section of  $y$ -axis ( 1mk)
- b. Estimate the angle corresponding to  $\cos(x-15) = 0.6$

23. The figure below shows rectangular plot ABCD with  $AB = 60\text{m}$  and  $BC = 45\text{m}$ .  
PN is a vertical pole of length  $30\text{m}$  to which four taut wire  $PB_1$ ,  $PC_1$ ,  $PD$  and  $PA$  are attached



Calculate

- a) length of the projection of P on the plane ABCD (2mrks)
- b) the angle PC made with the base ABCD (3mks)
- c) The angle between the planes PBC and ABCD (3Mrks)
- d) If point A is to be the North of point C. calculate the bearing of B from A (2mks)

24. a) The first term of an arithmetic progression (AP) is 2. The sum of the first 8 terms of AP is 256.
- i) Find the common difference of AP (2mks)
  - ii) Given that the sum of the first  $n$  terms of the AP 416. Find  $n$  (2mks)
- b) The 3<sup>rd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> terms of another AP forms the first three terms of a geometric progression (GP). If the common difference of the AP is 3. Find
- i) The first term of GP (4mks)
  - ii) The sum of the first 9 terms of the GP to 4 s.f (2mks)