• **Name-** **Index No.**

121/1 Candidates signature.

MATHEMATICS Date
Paper 1 ■■■ ■

July/August 2013

Time 2'/2 hours

WESTLANDS FORM FOUR JOINT EVALUATION

Kenya Certificate of Secondary Education.

- MATHEMATICS ■

Paper-121/1

Juiy/August 2013

. Time: *IV** hours

INSTRUCTIONS TO CANDIDATES

1. Write your name and Index number in the spaces above.
2. Sign and write the date of the examination in the spaces provided abpve.
3. This paper contains two sections. Section I and II.
4. Answer all questions in section I and ONLY five in section II *
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations giving your answer at each stage in the spaces provided below each question.
7. Marks may be awarded for correct working even if the answer is wrong.
8. Non-programmable silent calculators may be used and KNEC Mathematical tables may be used, except where stated otherwise. -
9. Candidates should check the questions paper to ascertain that all-the pages are printed as indicated and that no questions are missing.

EXAMINER'S USE ONLY _ : -

■ Section I '

Question	1	2,	3	*4*	5	6	7	8	9	10	11	12	13	14	15	16-	rotal
Marks																	

– SectionH							
Question	17	18	19	20	21	22	23*- 24	Total
Marks								

This paper consists IS printed pages

Grand total

Candidates should check the question paper to ensure that all the ■ printed pages are printed as indicated and no questions are missing.

Section I f50 marks)
Answer all the questions: in the spaces provided.

L Evaluate without using tables or calculator. (3 marks)

$$\frac{\text{VO. } 108 \times 14.7}{0.21 \times 0.048}$$

. 2. A two digit number is such that the sum of its digits is 10. If the digits are reversed the number formed exceeds the original number by 54 Find the number. (3 marks)

.3, Use reciprocal and square root tables to evaluate 3 — V0 .723 3 (3 marks)

4' the1^nyihlrq+ctiOn °f ^ milT°r Kne Which reflects P (‘7’ 4> ont° 1 °) Sivin S 7°ur answer in

5. Two of the interior angles of polygon are 95° and 115°. The rest are 150° each. How many sides does this polygon have? • (3 marks).

6. The mean of 10 observations is 12.5. While calculating the mean one observation was by mistake taken as (-8) instead of (+8). Find the correct mean. (3 marks)

7. Simplify (3 marks)

8. In the figure OA = a OB = b and DB is parallel to OA. C is on AB extended such that AB : BC = 2 :1 and thatOA = 3DB.

a) Express the vector BC in terms of a and b. (1 mark)

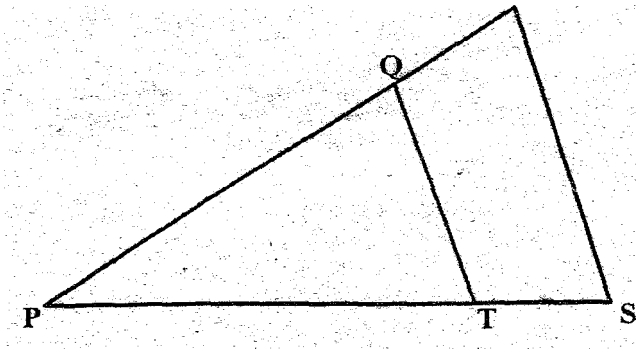
b) Show that the points O, D and C are collinear. (3 marks)

9. Solve for y $25^y = 10(5^y - 2,5)$ (3 marks)

10. Solve i'or v. hence calculate the difference between the minimum and maximum integral values ofx.
$3 + 10 * > 6x - 5 < 20 + 2x$ (3 marks)

II. in the figure QT is parallel RS PQ = 7.5cm, QR — 2.5cm, PT = 9.0cm and RS = 8cm. Find QT and TS (3 marks)

p,



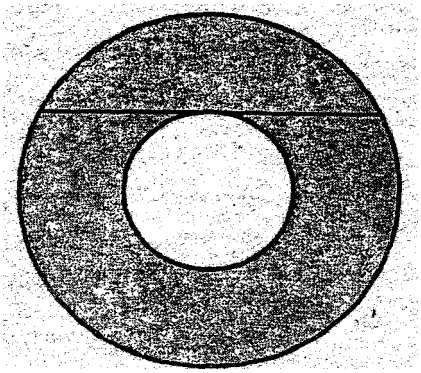
s'

12. The scale map is 1:200,000. The area of a forest on the map is given 11.7cm^2. Find the actual area of the forest in hectares. (3 marks)

13. Solve for *x* given that sin(3x - 50°) - Cos *(2x* + 10°) - 0 (3 marks)

14. William sports a tree directly across the river from where he is standing. He then walks 20ft upstream- and observes that the tree is now 62° from his previous position. Find the width of the river?(3 marks)

15. The circles below are concentric (have same center). The length of the chord tangent to smaller circle is equal to 20cm. What is the area between the two circles? (3;rnarks)



16. 1 he prices *ol* admission to a drama festival are as follows

Primary schools children - Kshs 100 each
Secondary student - Kshs 200 each
University . Kshs 400 each

One day the money taken from the university student was twice,the proceeds of the primary **sales-while** Is -t,cke£ *sold*. to secondary as to primary. If the total collection at the ticket office Ksiis. 2^,000. hind the number of tickets which were sold altogether. (3 $_m$a^$_s$) „

SECTION II (50 marks)

Answer oniv FIVE questions in this section ; -*i.*

17. A right circular cylinder of height 12cm and radius 4cm is filled with water. A heavy'circular cone *6%* height 9cm and base radius 6cm is lowered with vertex downwards and^axis vertical into the cylinder until the cone rest on the rim of the cylinder. Find.

a) The volume of the water that spill over from the cylinder. (4 marks)

b) The height of the water in the cylinder after the cone has been removed. - (3 marks) ■

c) The water that remained in the cylinder is made to fill the cone. Calculate the volume of water that remained in the cylinder after filling the cone. - .(3 marks)

18. A war plane observes that the angles of depression of radar from its current position 30°. It flies in a straight line towards the radar till he is 520m away from the-starting point and realised that the anele of depression is now 62° ®

a) Calculate the horizontal distance of the war plane from the radar from its original position? (5 marks)

b) Find the height of the war ship above the ground. (2 marks)

c) How far must it move along the horizontal such that the angle of depression is 80°? (3 marks)

19. a) Determine the X-intercept of the curve $y = x^3 - 9x$. * (2 marks)

b) Use the trapezium rule with 6 strips to find the areas bounded by the curve and the x-axis. (3 marks)

c) -By using integration, Sed the exact area bounded by the curve and the x-axis. (3 marks)

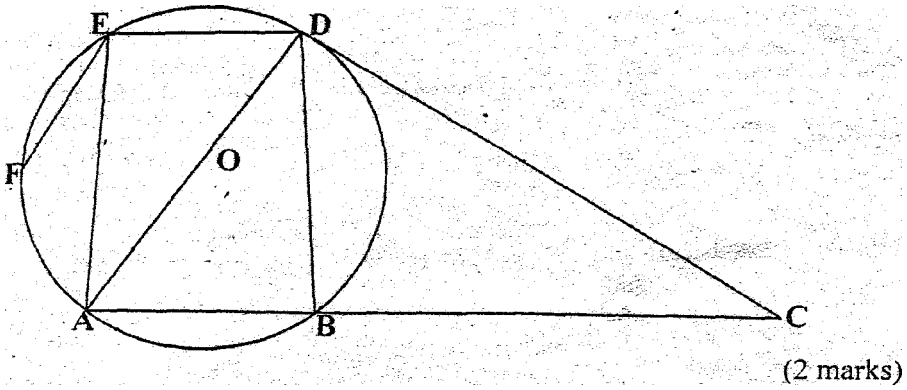
d) Calculate the percentage error in using trapezium rule to obtain the area;' (2 marks)

20. a) The matrix P = ^ ^ . Find its inverse. (2 marks)

b) A store sells large arid small sizes of blue and yellowT - shirts. The-selling price of large and small T-. shirt is shs *x* and shs *y* respectively regardless of the colour. Onyango bought 5 large and 3 small T-shirts and paid shs 840 while Kariuki bought 6 large and 4 small T-shirts and paid shs 1040. Using the inverse in (a) above, find the cost of large and small T-shirt. (4 marks)

c) The price of large* was increased by 20% and the price of the small ones were decreased by 10%. Using matrix method find the total cost of buying 8 large and 5 small shirt with the new prices. (4 marks)

21. In the figure below AODisthe diameter. ABC is a straight line. DE = BD, ZBDC = 28° and ZEAD=35°
O is the centre of the fcircie.'



Giving reasons, calculate,

a) ZBAD : . (2 marks)

b) ZADB (2 marks)

c) Acute ZEOD (2 marks)

d) ZDCB (2 marks)

e) ZAFE (2 marks)

22. The diagram below shows a histogram representing marks obtained in mathematics test by form one of

A

2.6r •

2.2- •

s l > .

0.0- 10.5 20.5 25.5 40.5 50.5 55^5

marks

a) Develop a frequency distribution table for the data. (4 marks)

b) State the modal frequency.

(1 mark)

c) Estimate the mean using the assumed mean of 33.

(5 marks).

23. Vector OA = { ^ knd OB = | l2| PointN is on OB suchthatNB 20N and point D is on AB such that
A0-3DB. 1-6/

a) Express as a column vector. .

i) AB- . ’ . -

(2 marks)

jt

ii)AJ>

(2 marks)

• ·.· ·...·. ·· ·· /

iii)OD hence find the coordinate of D

(3 marks)

b) The length of ND

(4 marks)

24. A and B are two towns 360 kilometres apart. A bus left A at 8.00 am travelling at 60km/h for town B. After forty minutes, a saloon car left A travelling in the same direction as the bus at a speed of 80km/h.

a) Mow far from B did the saloon car catch up with the bus?

b) At what time did it catch up with die bus?

c) When the saloon caught up with the bus it got a break - down and had to be repaired before proceeding to B at the same speed. If they both reached B at the same time, find how long it tool to repair the saloon?