

UNEB U.C.E MATHEMATICS (PAPER 2) 2004

SECTION A

1. Express 784 as a product of prime factors. Hence find the square root of 784.
2. If the exchange rate of a Kenya shilling to Uganda shilling is 1 K.shs=24 Ushs. And an American dollar to Uganda shilling is \$1=ush1, 950 how many American dollars would one get in exchange for Ksh9, 750?
3. In the diagram below, is a tangent to the circle with centre O and angle BAO = 30.

CIRCLE

Find the size of the angles x and y.

4. Given that the representative fraction of a map is , find the length of a horizontal road on the map whose length on the ground is 66.25 km long.
5. The transformation described by the matrix maps the point P (-1, 3) onto its image P" (10, 8). Find the values of b and c.
6. In the figure below, = 8.0cm, =12.0cm and =5.0 cm.

TRIANGLE

Given that is parallel to , find length .

7. Solve the equation $3x^2 + 10x = 8$
8. Given that $133n = 43ten$, find the value of n.
9. A fair die with faces marked 1, 2, 3, ..., 6 and a fair coin with one side showing a court of arms (c) and the other side a fish (F) are tossed together once.
 - a) Construct a possibility space showing all the possible outcomes.
 - b) Find the probability that a six and a fish will show up.
10. The angle of depression of the sun's rays to a man's head is 140° . If the man, whose height is 1.7 m, is standing upright on horizontal ground, find the length of his shadow, correct to 2 significant figures.

SECTION B

11. a) At the beginning of the year 2000, a customer deposited shs1, 900,000 in a bank which offers a compound

interest rate of 2.75% per four months. Find how much interest he earned at the end of the year.

b) a cooking oil factory offers a trade discount of 2% to its customer. It also offers a 1% cash discount to any

customer who pays cash for the oil bought. If the factory price for a 20-litre jerrican of cooking oil is shs30, 000.

Find the amount of money a customer saves by paying cash for 100 jerricans of the oil.

12. The coordinates of the vertices of a triangle OAB are O (0, 0), A (1, 0) and B (1, 1).

a) find the coordinates of the image formed when

(i) Triangle OAB undergoes a translation of to form O'A'B'.

(ii) O'A'B' is transformed by the matrix to form O''A''B''.

b) (i) plot triangle OAB and its images on the same graph.

(ii) use your graph to find the area of triangle O''A''B''.

13. Two cyclists C1 and C2 start at the same time from trading centre P travelling to trading centre Q which is 24

km apart. Cyclist C1 starts at a steady speed of 10kmh⁻¹ greater than that of cyclist C2 who also travels at a steady

speed. When C1 has covered half the distance, he delays for three quarters of an hour, after which he travels at a

speed 25% less his original speed and arrives in trading centre Q fifteen minutes earlier than cyclist C2.

a) determine the speeds of cyclists C1 and C2

b) If cyclist C2 started from trading centre Q at the same time as cyclist C1 started from trading centre P, both of

them travelling non stop on the way, find how far from Q the two cyclists would meet. After how long would they

meet?

14. a) Plot the graph $y = 3x^2 + 2x - 16$ for values of

b) Use your graph to solve the equation $3x^2 + 2x - 8 = 0$.

15. The bearing of tower A from point O is 060° and that of tower B from O, 200° . $OA = 24\text{km}$ and $OB = 33\text{km}$.

Tower C is exactly halfway between towers A and B.

a) Using a scale of 1 cm to represent 5km, draw an accurate diagram showing the positions of the towers.

b) use your diagram to find

(i) distances and .

(ii) the bearing of tower B from tower A,

(iii) the bearing of tower C from O.

c) Find (i) the average speed of a cyclist who takes $2\frac{1}{4}$ hours to travel directly from A to B

(ii) How long it takes another cyclist to travel from A to B via O at a steady speed of 4.5kmh^{-1} faster than that of the

cyclist in (c)(i) above.

16. The diagram below shows a quadrilateral OSRQ. $OS = q$, $OP = p$ and $SX = k$ (SP)

QUADRILATERAL

(i) Express vectors SP and OX in terms of p, q and k.

(ii) If $OQ = 3p$ and $QR = 2OS$, and $OX = lOR$, find the values of k and l. hence find the ratio SX: XP.

17. In the diagram below VABCD is a rectangular base ABCD and V, the vertex. O is the centre of the base ABCD. $VO = 8\text{m}$. $AO = 6\text{m}$. $AM = 13\text{m}$. M is a point on VO such

that . M is also the centre of base EFGH of a small pyramid VEFHG similar to VABCD which is to be cut off from the original pyramid VABCD.

PYRAMID

Find the:

(i) Dimensions of the base EFGH.

(ii) Height of pyramid VABCD.

(iii) Volume of the remaining part of pyramid VABCD when VEFHG is cut off.