

ENTEBBE BRIGHT SECONDARY SCHOOL

S.3 BOT TERM III EXAMINATIONS 2022

MATHEMATICS, PAPER 1

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

Answer all questions in section A and any three from section B

All necessary calculations must be done on the same page as the rest of the answers.

Silent non-programmable scientific calculators may be used.

Mathematical tables with a list of formulae and squared papers are provided.

No paper should be given for rough work

SECTION A: (40 MARKS)

Attempt all questions in this section.

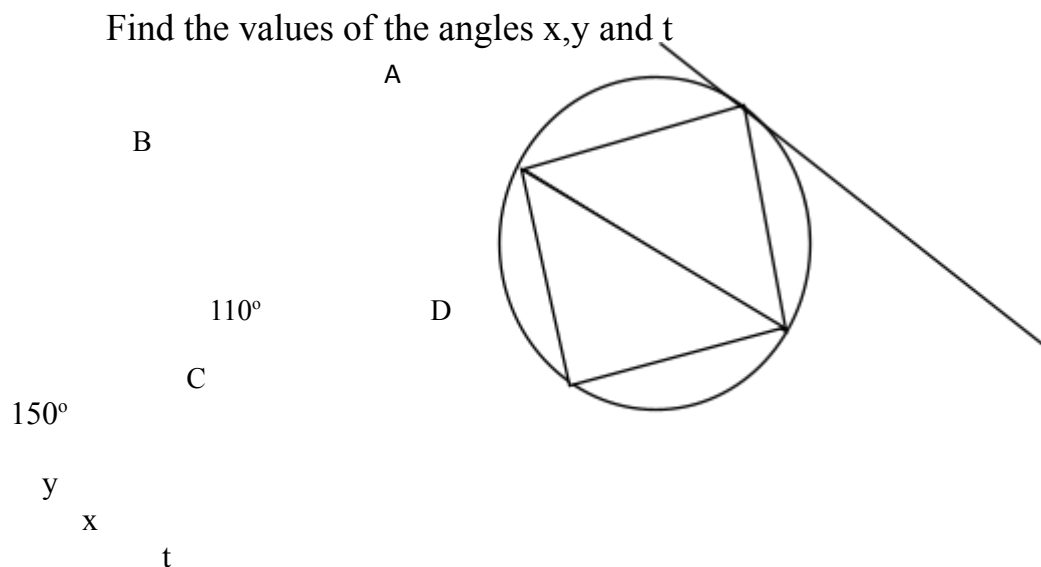
- Given that $a * b = a^b - 5$. Evaluate
 - $2 * 3$
 - $(2 * 3) * 4$
- Express $\frac{3-\sqrt{3}}{3+\sqrt{3}}$ in the form $a + b\sqrt{c}$. Hence state the values of **a** and **b**
- Make x the subject of the formula $\frac{L}{T} = \frac{x^2 - a}{x^2 + a}$
- Factorise completely $5a^2 - 20$. Hence solve the equation $5a^2 - 20 = 0$
- The goals scored by some players in a tournament are summarized in the table below

Goal	1	2	3	4	5
No of players	2	a	3	2	1

If the mean number of goals scored is 2.8. Determine how many players scored goals.

- Use matrix method to solve the simultaneous equations
$$2x + 5y = 12$$
$$3x - y = 1$$

7. In a class, the ratio of boys to girls is 3:2. If five boys leave the class and 10 girls join the class, the number of boys will be the same as that of girls. How many pupils are in the class?
8. Given that $\tan\theta = \frac{3}{4}$ and θ is a reflex angle. Without using tables or a calculator, evaluate $\sin\theta + \cos\theta$.
9. Solve the quadratic equation $2x^2 - 2x - 15 = 0$
10. In the figure below **AT** is a tangent to the circle.



SECTION B (36 MARKS)

Answer **any three** questions. All questions carry equal marks

11. Below are the marks scored by 50 students in a chemistry test

32	11	42	51	68	36	33	29	59	32
22	56	32	78	45	15	47	53	62	46

37	63	27	47	25	42	25	30	49	23
66	41	56	35	49	73	58	48	17	53
58	31	72	40	65	55	39	28	44	64

- (a) Construct a frequency distribution table with equal class intervals, starting with 10 – 19
- (b) Draw a cumulative frequency curve and use it to estimate the
- Median mark
 - Number of students who scored 35% and above
- (c) Calculate the mean mark

12. A plane flew from town **A** on a bearing of **050°** to town **B** at a speed of **100kmh⁻¹** for **5** hours. From **B**, the plane changed course and flew on a bearing of **110°** to town **C** at a speed of **150 kmh⁻¹** for **4** hours.

- (a) Calculate the
- Distance of town **C** from town **A**
 - Bearing of town **C** from town **A**

(b) If the plane return from town **C** directly to town **A** at a speed of **200kmh⁻¹** how long will it take?

13. Using a ruler and a pair of compasses only

- (a) Construct a triangle **ABC** such that **AB** = 8cm, **∠ABC** = 60° and **∠BAC** = 75°
Measure the length **BC**. Hence calculate the area of the triangle **ABC**

(b) Construct a circum circle to the triangle **ABC**. Measure the radius of the circle.

14.(a) If the matrix $\begin{pmatrix} n & + & 4 & 3 & 4 & n \end{pmatrix}$ has no inverse, Find the possible values of **n**

(b) A factory makes three products **X**, **Y** and **Z**. The table below shows the units of labour materials and other items needed.

	Labour	Materials	Other item
X	4	1	2
Y	2	4	1
Z	1	5	2

Labour costs shs 2000 per unit, material shs 3000 per unit and other item cost shs 5000 per unit.

- (i) Write down a matrix representing the products
- (ii) Write down a cost matrix
- (iii) Using matrix multiplication, determine the cost of each product **X**, **Y** and **Z** in shillings.

15.(a) Given that $f(x) = \frac{x^2 - 1}{5}$, find ;

(i) $f^{-1}(x)$

(ii) The values of $f^{-1}(16)$.

(b) If $g(x) = x^2 - 2x - 1$ and $h(x) = x + 3$, find the value of x for which

$$hg(x) - gh(x) = 2.$$

END