

# KIIRA COLLEGE BUTIKI

## *Uganda Advanced Certificate of Education*

### SUBSIDIARY MATHEMATICS

#### Paper 1

#### Lock down revision questions

#### SECTION A.

1. Solve the simultaneous equations

$$\log_4(xy) = 1$$

$$\log_4\left(\frac{x}{y}\right) = 3$$

(5 marks)

2. The curve  $y = x^2 - qx + p$  has a turning point at (3, 10), find the values of p and q.

(5 marks)

3. The table below shows the results obtained by six candidates in a typing competition based on speed and accuracy.

<i>Candidate</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
<i>Time (min.)</i>	55	35	45	40	60	45
<i>Number of errors</i>	18	12	10	9	5	3

By ranking the fastest and one with fewer errors as best, calculate the rank correlation coefficient and use it to comment on the relationship between typing speed and number of errors.

(5 marks)

4. Solve the differential equation  $\frac{dy}{dx} = 2x - 7$ , given that  $x = 4$  when  $y = 3$ . (5 marks)

5. Solve the equation  $2\cos^2 x - 3\sin 2x = 0$  for  $0^\circ \leq x \leq 360^\circ$  (5 marks)

6. The weights of cabbages from a garden are said to be normally distributed with mean weight 2.4kg and standard deviation 0.5kg. Find the probability that a cabbage selected at random weighs between 1.8kg and 2.7 kg. (5 marks)

7. Two events A and B are such that  $p(A) = \frac{3}{4}$ ,  $p(B) = \frac{4}{7}$  and  $p(A \cap \bar{B}) = \frac{2}{5}$ , find;

(i)  $p(A \cap B)$

(ii)  $p(A/B)$ .

(5 marks)

8. A cyclist started from rest, accelerated uniformly for 3 minutes and then maintained a speed of  $80\text{kmh}^{-1}$  for 15 minutes. He then decelerated uniformly for 2 minutes before coming to rest. How far has the cyclist travelled from the start? **(5 marks)**

### SECTION B.

9. (a.) The position vectors of points A, B and C are  $2i + 3j$ ,  $i - 5j$  and  $10i + 7j$  respectively. Find angle ABC. **(5 marks)**
- (b.) Given matrices  $A = \begin{pmatrix} 3 & -5 \\ 8 & 1 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & 1 \\ 1 & -3 \end{pmatrix}$ .  
find  $AB - 3I$ , where  $I$  is a  $2 \times 2$  identity matrix. **(4 marks)**
- (c.) In a certain super market shs.3,3000 can buy 15 books and 6 pens and shs.1,0500 can buy 3 books and 9 pens. Use matrix method to find the cost of a book and a pen. **(6 marks)**
10. The table shows the weights of animals on a certain exotic farm.

Weight (kg)	Number of Animals
$80 \leq X < 120$	8
$120 \leq X < 160$	16
$160 \leq X < 200$	39
$200 \leq X < 240$	30
$240 \leq X < 280$	12
$280 \leq X < 320$	5

- (a.) Draw a histogram to illustrate the information above and estimate the modal weight.
- (b.) Calculate;  
(i) Median.  
(ii) Mean.  
(iii) Standard deviation. **(15marks)**
11. (a.) The table below shows the consumption of some selected items in 2012 and 2015.

ITEMS	2012		2015	
	PRICE	QTY	PRICE	QTY
MEAT	7100	10	8000	8
MATOKE	10000	15	12500	12
BEANS	1500	25	1600	20
SUGAR	1600	20	2500	22
RICE	2000	30	3500	40

Using 2012 as your base year, calculate the weighted price index for the items in 2015 and comment on your result. **(5marks)**

- (b). The table below shows the Quarterly production of Sugar canes in thousands of tones in Busoga region for the period 2012 – 2014.

<b>YEAR</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>1<sup>ST</sup> QUARTER</b>	<b>540</b>	<b>549</b>	<b>453</b>
<b>2<sup>ND</sup> QUARTER</b>	<b>516</b>	<b>402</b>	<b>318</b>
<b>3<sup>RD</sup> QUARTER</b>	<b>450</b>	<b>378</b>	<b>294</b>
<b>4<sup>TH</sup> QUARTER</b>	<b>519</b>	<b>411</b>	<b>351</b>

- (i). construct a 4 point moving average.  
 (ii). Graph the moving averages together with the original data.  
 (iii). Comment on the trend of Sugarcane production over the 3 year period. **(10marks)**

12. (a). In a game the probability that a player scores is  $\frac{2}{3}$ , five players were to play.

Find;

- (i). Probability that at least 4 score.  
 (ii) Expected number of players who score. **(7marks)**

- (b). The discrete random variable x has probability density function

$$f(x) = \begin{cases} \frac{k}{x} & ; \quad x = 1, 2 \\ kx & ; \quad x = 3, 4, 5 \\ 0 & ; \quad \text{Otherwise} \end{cases}$$

Find ; (i).Mode.

- (ii). Mean of x. **(8marks)**

13. (a). Given that  $y = (x + 2)^2 - 9$ , find;

- (i). intercepts.  
 (ii). Turning points.  
 (iii). Sketch the curve.

- (b). find the area enclosed by the curve in (a)(iii). above and the x-axis. **(15marks)**

14. (a). A force acting on a particle of mass 75kg moves it along a straight line with a velocity of  $20\text{ms}^{-1}$ . The rate at which work is done by the force is 40 watts. If the particle starts from rest, determine the time it takes to move a distance of 250m. **(8marks)**

- (b). A bus whose mass is 275mg moves up an inclined plane of 3 in 100 at a uniform rate of 48km/h. The resistance due to friction is equal to the weight of 4mg. At what power is the engine working? **(7marks)**