S475/1

SUBSIDIARY

MATHEMATICS

Paper 1

JULY/AUGUST 2026

$2\frac{1}{2}$ hours

# JINJA JOINT EXAMINATIONS BOARD

*Uganda Advanced Certificate of Education*

MOCK EXAMINATIONS –JULY / AUGUST, 2026

SUBSIDIARY MATHEMATICS

Paper 1

2 hours 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

*This paper consists of two sections;* **A** *and* **B.**

*Section* **A** *is* ***compulsory.***

*Section* **B** *consists of* **two** *parts;* **one** *and* **two.** *Answer only* **two** *questions from this section, choosing* ***only one*** question from each part.

*Any additional question(s) answered will* **not** *be marked.*

**All** *necessary working* **must** *be shown clearly.*

*Begin each answer on a fresh sheet of paper.*

*Graph paper is provided.*

*Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

Super Platinum Submaths Collections - 0757373064



© 2026 Jinja Joint Examinations Board 

CamScanner

**Item One**

Two drones were deployed by government to drop food packages to specific places in Bududa district specifically to those people who had been affected by landslides.

These drones had one control room which had coordinates C(2,5) on a google map.

Drones A and B were sent to places with coordinates on a Google map as A(4, 8) and B(15, 11) kilometers respectively.

For the deliveries to be made successfully, the angle between the drones relative to the control room must be at least $30^0$. The drone controller would like to know whether the deliveries were successful or not.

In this control room, the drone controller monitors the flights of the drones using a signal transmitter which has two antennae attached to it at the same point. The signal strength depends on the orientation angle $\theta$ of the transmitter's antennae relative to the tower. To have a high signal strength, the orientation angle between the two antennae should be at most $60^0$; $(0^0 \leq \theta \leq 90^0)$.

The drone controller modelled the signal strength(S) as $-2sin^2\theta - 3sin\theta + 3.5 = 0$. The drone controller would like to know whether this model can produce high signal strength or not.

**Task:**

With mathematical justifications, help the drone controller to get the required information.

**Item Two**

GML construction company has been contracted by Joyo town council to renovate the curved road that connects the town council headquarters to the district headquarters. The road to be renovated has many corners which must be reduced.

The road is modelled by the equation $y = x^4 - 3x^2 + 5x - 2$ and the company manager has decided to reduce all the corners near those points with slopes more than 9 since many vehicles fall there. These corners are near points A (0,1), B (2,6) and C (-1,5). The company manager would like to know the corner(s) to be reduced.

This company has also been contracted by the town council mayor to construct for them a parking lot for motorcycles which is curved with a mathematical relationship $y = x^2 - 11x + 10$ and enclosed by a straight road given by $y = 0$. In their plan, each motorcycle will be occupying an area of $2.025m^2$.One day, the mayor received a call informing him that he is going to visited by 70 people each with a motorcycle. The mayor would like to know whether the parking lot will be enough or not.

After the mayor receiving the phone call, he started informing the community members about the visitors coming. The rate at which the number of people getting information was increasing is proportional to the number of people who had heard the information at any time t-hours and the proportionality constant was 1.2. Initially 2 people had heard the information and they agreed to start the meeting when the number of people with the information reaches 20. The mayor would like to know when the meeting will start.

**Task;**

**(a)** Advise GML construction company manager on the corners to be reduced.



© 2026 Jinja Joint Examinations Board 

Super Platinum Sumaths Collections - 0757373064

CamScanner

(b) By illustrating the required parking lot and with mathematical justifications help the mayor with the details he wants.

## SECTION: B
### Part one
Attempt only *one* item from this part

**Item Three**

In Kyomya west Budondo, a group of people started a savings scheme.

They set up a policy that their total monthly savings must be increasing by a certain amount.

In January 2026, they saved a total of UGX. 500,000, in February, they saved UGX. 600,000, in March 2026, they saved UGX. 700,000. They agreed to buy a plot of land worth UGX. 10,000,000 using their cumulative savings but they don't know when it will be possible.

To run the scheme successfully, the members agreed to form an executive committee of four people from among themselves with at least a member of each gender on the committee but they don't know the possible number of ways of selecting this committee.

They also decided that a new member willing to join the scheme, must contribute $UGX.20000(2\log x^2 - \log x^4 + 6\log 10)$ where $x$ is the savings growth factor.

Mrs. Munaaba has UGX. 97,000 and she would like to join the scheme but she is not sure whether she will be allowed or not.

**Task;**

With mathematical justifications, help the members and Mrs. Munaaba with a detailed analysis of the required information.

**Item Four**

Mukasa received a government youth livelihood grant and invested the funds into an intensive poultry-keeping project.
In the first month, he bought 32 improved local chicken, in the second month he bought more 64 birds and in the third month, he bought more 128 birds. Mukasa had constructed a standard poultry shelter that safely accommodates a total of 4064 birds. He would like to know when the total number of birds will hit the shelter's capacity and he has also said that if the number of months needed to hit the shelter's capacity exceeds 5, he will sell all the birds at once.

At this very poultry farm, the workers had 4 layers,2 broilers which were distinct and 5 other identical birds to put in 10 available cages. The workers were bothered about the numbers of ways in which they can arrange all the birds so that the two broilers are in the same cage.

The daily feeds needed at the farm depends on seasonal grain prices. The farm analyst modelled the feeds required as $3x^2 + (k+2)x + 12 = 0$ where k is a constant feed quantity(kg) and $x$ is the varying feed quantity needed on the farm. The model should have equal roots not to cause a financial loss to the farm but Mukasa does not know the possible value(s) of $k$ that can make this possible.
**Task;**

Super Platinum Submaths Collections - 0757373564



© 2026 Jinja Joint Examinations Board 

CamScanner

As a mathematics student help Mukasa to;

(a) Have an informed decision on when the number of birds will hit the shelter's capacity and whether to sell all the birds.

(b) Determine the possible number of ways of arranging the birds in the available cages and the possible values of the constant feed quantity

## Part two

Attempt only ***one*** item from this part

### Item Five

At a certain rice milling machine, rice to be sold is put in sealed bags after taking their measurements. Some of bags sealed are underweight and others have standard weights from the analysis made.

It was noted that out of every 100 bags sealed, 30 bags are under weight (weigh less than 50kg) which caused a serious concern to UNBS. One day UNBS officials visited the rice store abruptly and re-measured the different bags but before re-measuring, UNBS officials agreed with the machine owner that;

(i) the license will be withdrawn if the chances of getting at least 10 bags from the 15 bags selected being underweight is greater than 0.2.

(ii) If the variance is greater than 2, then there will be a fine of UGX 700,000.

The weights of bags sealed are also normally distributed with mean weight of 48kg and standard deviation of standard deviation of 4. The machine owner decided to buy a new weighing scale if the chance of getting a bag weighing less than 45kg is greater than 0.5 otherwise he remains with the old weighing scale.

At this milling machine, the owner sold bags of unprocessed rice, processed rice and sacks of rice husks with the intention to raise UGX. 83,000,000 to buy an acre of land to expand the project.

In that particular month, he sold 40 bags of unprocessed rice, 60 bags of processed rice and 30 sacks of rice husks to Muzani. 30 bags of unprocessed rice, 50 bags of processed rice and 27 sacks of rice husks to Joel. 25 bags of unprocessed rice, 43 bags of processed rice and 32 sacks of rice husks to Hamson. 32bags of unprocessed rice, 29 bags of processed rice and 12 sacks of rice husks James. Each bag of unprocessed rice, processed rice and sack of rice husks were sold at UGX. 180,000, UGX. 280,000 and UGX. 15,000 respectively but he does not know whether the sales made will raise the required amount to buy land.

**Task;**

With mathematical evidences, justify the decisions to be taken by UNBS and also help the owner to determine the required information.

Super Platinum Submaths Collections- 0757573064



© 2026 Jinja Joint Examinations Board 

CamScanner

**Item Six**

At Doho health Centre II, a team of clinical officers had an argument on whether there is a very high relationship between the heights of patients and length of the arms or not.

They selected a sample of 10 patients and took their measurements and recorded the results in the table as shown below:

| **Patient code** | **P01** | **P02** | **P03** | **P04** | **P05** | **P06** | **P07** | **P08** | **P09** | **P10** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Height(x) cm** | 132 | 145 | 128 | 150 | 135 | 140 | 132 | 155 | 142 | 138 |
| **Length of the arm (y) cm** | 32 | 40 | 28 | 48 | 33 | 35 | 30 | 52 | 41 | 33 |

Their team leader told them that the relationship is said to be very high positive if the coefficient of correlation is at least 0.80 otherwise it is not very high. The clinical officers wanted to confirm whether there is a very high positive relationship between height and length of the arm using the data gathered and they also wanted to know what could be the height for a patient whose length of the arm is 46cm.

The clinical officers also wanted to determine the standard deviation for height of the patients selected with the intention to order for a new measuring tape to be used. They agreed that if the standard deviation for height exceeds 8.0, they will order for a new measuring tape otherwise they maintain the old one.

One patient brought 7 oranges and 3 lemons in a small covered bag as a gift to the clinical officers. He told one clinical officer to pick two fruits at random one at a time without returning any fruit. This clinical officer was interested in picking one lemon and one orange but he did not know the chances he had to pick what he wanted.

The health center supervisor, records the number of patients(X) received each day with a probability distribution as shown below;

| Number of patients | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| $P(X = x)$ | 0.10 | k | 1.5k | 0.25 | 0.15 |

The supervisor said that if $P(X \geq 2)$ is greater than 0.80, he will add one another clinical officer on duty every day otherwise he maintains the same number of clinical officers on duty.

**Task;**

Using mathematics justifications, help the team of clinical officers and the supervisor with the required information.

END

Super Platinum Submaths Collections - 0757373064



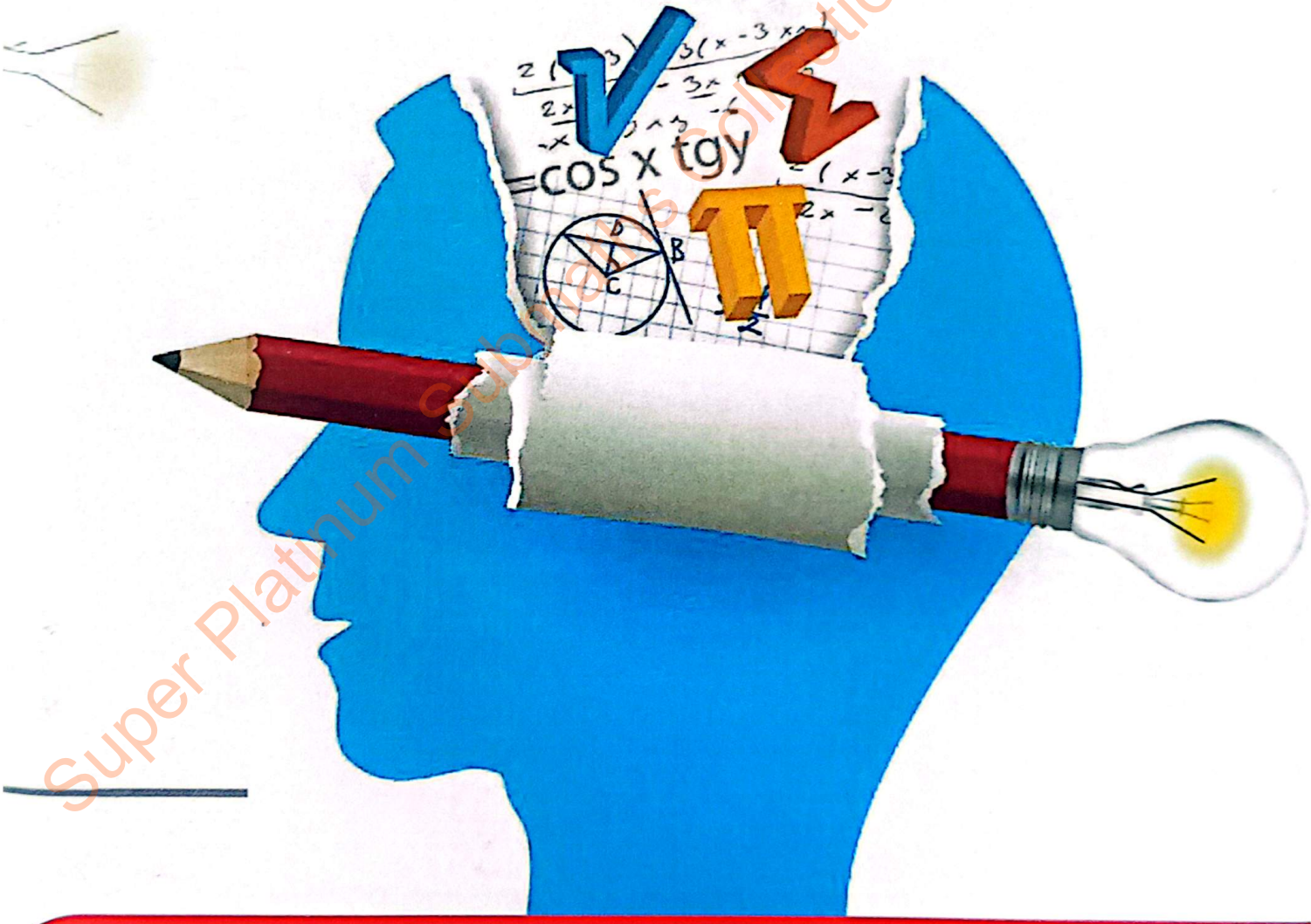
© 2026 Jinja Joint Examinations Board End

CamScanner

SHULE.TV

# MATHEMATICS SEMINAR

## SUB-MATH ITEM BOOKLET (A-LEVEL)




NEW ADVANCED LEVEL SECONDARY CURRICULUM (UACE)

Super Platinum Subjects Collections - 0757373064

CamScanner

# SUBSIDIARY MATHEMATICS SEMINAR ITEMS

# SECTION A: GEOMETRY AND CALCULUS

## Item 1

During preparations for a regional science exhibition, a school technical team sets up three service points on a rectangular compound. The control desk is placed at point $A$, the camera stand at point $B$, and the emergency support point is placed at point $C$. Their positions, measured from the main gate $O$, are represented by the position vectors

$$\overrightarrow{OA} = 5\mathbf{i} + 2\mathbf{j}, \qquad \overrightarrow{OB} = 4\mathbf{i} + 6\mathbf{j}, \qquad \overrightarrow{OC} = -2\mathbf{i} + 6\mathbf{j}..$$

For safety and clear communication, the team plans to lay two signal cables from the emergency support point, one to the camera stand and the other to the control desk. The cable from $C$ to $B$ should not exceed 7 units, while the cable from $C$ to $A$ should be less than 9 units. The two cable routes should also make an angle greater than $40°$ but less than $80°$, so that people can move safely between the service points.

At the same exhibition, a rotating search light is programmed so that its direction angle $x$ satisfies

$$6\cos^2 x - \cos x - 1 = 0,$$

where $0° \leq x \leq 360°$. The search light will only be used if all possible directions in this interval can be identified correctly.

**Task**

As a mathematics student, use mathematical justification to help the technical team decide whether:

(a) the available cable materials should be used by checking whether the routes $CB$ and $CA$ satisfy the stated length limits;

(b) the space between the two cable routes should be approved for pedestrian movement by checking whether the angle between $CB$ and $CA$ lies within the safe range;

(c) the search light should be programmed for use by finding all possible direction angles $x$ in the interval $0° \leq x \leq 360°$.

## Item 2

A community health team is organising a free medical camp at a trading centre. The main registration tent is taken as the origin $O$. A triage point $P$, where patients are first examined, is located with position vector

$$\overrightarrow{OP} = \begin{pmatrix} 2 \\ 3 \end{pmatrix},$$

while a medicine collection point $Q$ is located with position vector

$$\overrightarrow{OQ} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}.$$

The organisers want to mark the three points $O$, $P$, and $Q$ to form a triangular movement zone for patients and health workers.

Super Platinum Submaths Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731 DOWNLOAD SHULE APP FROM Google play App Store LEARN AT YOUR CONVENIENCE



CamScanner

To avoid long walking distances for sick patients, each side of the triangular movement zone should not exceed 6 units. For proper crowd control, the angle between the routes $OP$ and $OQ$ should be at least $60°$, so that the two queues do not become too close to each other.

At the same event, a rotating emergency lamp is programmed so that its direction angle $x$ satisfies

$$\sin^2 x + \sin x \cos x = 0,$$

where $0° \le x \le 360°$. The lamp will only be used if all possible direction angles in this interval can be identified correctly.

**Task**

As a mathematics student, use mathematical justification to help the community health team decide whether:

(a) the triangular movement zone $OPQ$ should be marked out by checking whether each side is within the maximum walking-distance limit;

(b) the two patient queues should be allowed to start from $O$ by checking whether the angle between $OP$ and $OQ$ is wide enough for crowd control;

(c) the emergency lamp should be adjusted for use by finding all possible direction angles $x$ satisfying the given trigonometric equation.

## Item 3

A community road-safety team is planning three temporary service points for a weekend clean-up and health campaign. Point $A$ is a water station, point $B$ is a waste collection point, and point $C$ is a first-aid point. Their position vectors from the community office $O$ are given by

$$\overrightarrow{OA} = 4\mathbf{i} - \mathbf{j}, \qquad \overrightarrow{OB} = \mathbf{i} + 3\mathbf{j}, \qquad \overrightarrow{OC} = -5\mathbf{i} + 2\mathbf{j}.$$

The team wants to mark the directed routes $\overrightarrow{AB}$, $\overrightarrow{BC}$, and $\overrightarrow{CA}$ so that volunteers know the correct movement direction between the service points. For easy movement, the triangular working area should have all its angles clearly determined, and each angle should be greater than $20°$ so that no corner is too narrow for people carrying equipment.

During the same activity, a ladder is placed against a wall to hang a campaign banner. The angle $\theta$ made by the ladder with the ground is acute, and the height-to-ladder ratio is given by

$$\sin\theta = \frac{7}{25}.$$

For safe support, the ladder will be used only if the base-to-ladder ratio is at least 0.90 and the height-to-base ratio is not more than 0.35.

**Task**

As a mathematics student, use mathematical justification to help the community road-safety team decide whether:

(a) the volunteer movement routes should be painted on the ground by correctly determining the directed vectors $\overrightarrow{AB}$, $\overrightarrow{BC}$, and $\overrightarrow{CA}$;

(b) the triangular working area should be approved by checking whether each angle of triangle $ABC$ is greater than $20°$;

(c) the ladder should be used for hanging the banner by finding $\cos\theta$ and $\tan\theta$, then checking whether the base-to-ladder and height-to-base ratios satisfy the safety limits.

Super Platinum Sub Maths Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731
DOWNLOAD SHULE APP FROM Google play App Store
LEARN AT YOUR CONVENIENCE



CamScanner

along the path. The area enclosed by the curve, the vertical lines $x = 0$ and $x = 1$, and the $x$-axis will be covered with paving slabs.

In another section of the garden, the slope of a second curved path at any point is given by

$$\frac{dy}{dx} = 3x^2 - 2x + 1.$$

The path passes through the point $(-1, 4)$, and its equation is needed for accurate construction.

**Task**

As a mathematics student, use mathematical justification to help the community youth group decide whether:

(a) the curved pedestrian path should be accepted by finding the turning point of $y = (2 + x)(1 - x)$ and identifying whether it gives a highest or lowest point;

(b) the number of paving slabs should be estimated by sketching the curve clearly and calculating the area bounded by the curve, $x = 0$, $x = 1$, and the $x$-axis;

(c) the second curved path should be constructed by finding its equation from the given gradient function and the point $(-1, 4)$.

## Item 8

A community recreation group is designing a curved walking track and a drainage edge for a public garden. The amount of material needed for part of the curved track is represented by the integral

$$\int_{-1}^{3} x(x + 1)\, dx.$$

For another section of the garden, the gradient function of a curved boundary is given by

$$\frac{dy}{dx} + 4 = 12x.$$

The curve passes through the point $(-2, 30)$, and its equation is needed for setting out the boundary accurately.

At the point on this curve where $x = 1$, a straight drainage edge is to be constructed normal to the curve. The drainage edge will be accepted only if its equation is correctly determined.

**Task**

As a mathematics student, use mathematical justification to help the community recreation group decide whether:

(a) the material estimate for the curved track should be accepted by evaluating $\int_{-1}^{3} x(x + 1)\, dx$;

(b) the curved boundary should be set out by finding its equation from $\frac{dy}{dx} + 4 = 12x$ and the point $(-2, 30)$;

(c) the drainage edge should be constructed by finding the equation of the normal to the curve at $x = 1$.

Super Platinum Submaths Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731 DOWNLOAD SHULE APP FROM Google play App Store LEARN AT YOUR CONVENIENCE



CamScanner

# SECTION B PART I: ALGEBRA

## Item 9

A secondary school is selecting teachers to attend a professional development workshop. The school has 9 A-level teachers. In the Science department, there is one teacher for each of the subjects Mathematics, Physics, Chemistry, and Biology. In the Arts department, there is one teacher for each of the subjects Economics, Geography, History, Literature, and Fine Art.

The school can send only 3 teachers to the workshop. The transport budget can support any one group of 3 teachers, but the administration wants to know the total number of possible groups before making the final selection. For balanced academic representation, the administration will be satisfied only if the probability of selecting at least two Science teachers is greater than $\frac{1}{3}$. The workshop organisers have also stated that the Mathematics teacher must attend; therefore, the school must determine how many possible groups can still be formed under this condition.

In the same school, the academic department is preparing a revision programme whose weekly target follows an arithmetic progression. The sum of the first 16 weekly targets is 1088, and the $16^{\text{th}}$ target is twice the $8^{\text{th}}$ target. The programme will be adopted only if the first weekly target is not less than 8, so that the revision schedule begins with enough work.

**Task**

As a mathematics student, use mathematical justification to help the school administration decide whether:

(a) the workshop selection list should be prepared by determining the total number of possible groups of 3 teachers;

(b) the selection method should be considered suitable for Science representation by checking whether the probability of selecting at least two Science teachers is greater than $\frac{1}{3}$;

(c) the workshop and revision plans should be adopted by finding the number of teams when the Mathematics teacher must attend and checking whether the first term of the arithmetic progression is at least 8.

## Item 10

A school games committee is preparing records for a football tournament and a related sports-day arrangement. In the store, some equipment records are represented by the matrices

$$M = \begin{pmatrix} 4x & 6 \\ -5 & -2x \end{pmatrix}, \quad N = \begin{pmatrix} -1 & -2 \\ 3 & 3y \end{pmatrix}, \quad K = \begin{pmatrix} y & 4 \\ -2 & 12 \end{pmatrix}.$$

The committee expects the records to satisfy $K = M + N$. The values of $x$ and $y$ will be accepted only if they are positive and do not exceed 6, so that the equipment record remains within the planned stock limit.

In the football tournament, three teams, Arsenal, Chelsea, and Liverpool, had the following results:

| Team | Wins | Draws | Losses |
|---|---|---|---|
| Arsenal | 2 | 1 | 1 |
| Chelsea | 2 | 0 | 2 |
| Liverpool | 1 | 2 | 1 |

Super Platinum Submaths Collections - 0757 913064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731
DOWNLOAD SHULE APP FROM 7
Google play App Store
LEARN AT YOUR CONVENIENCE

CamScanner

The teams are awarded 3 points for a win, 1 point for a draw, and no point for a loss. The tournament winner will be confirmed only if the leading team gets at least 7 points.

For the decoration stand, the simplifying factor for one of the measurements is

$$\frac{6\sqrt{10}+2\sqrt{40}}{\sqrt{2}\times\sqrt{20}}.$$

The measurement will be accepted only if the exact simplified value is not greater than 5.

**Task**

As a mathematics student, use mathematical justification to help the school games committee decide whether:

(a) the equipment record should be accepted by finding $x$ and $y$ from $K = M + N$ and checking whether both values are positive and not greater than 6;

(b) the football tournament winner should be confirmed by using matrix multiplication to calculate the points for each team and checking whether the leading team has at least 7 points;

(c) the decoration measurement should be used by simplifying the surd expression exactly and checking whether its value is not greater than 5.

## Item 11

A school welfare committee is planning a termly savings programme for supporting needy learners. The amounts saved each week are arranged in an arithmetic progression. The second weekly saving is 15 units, and the fifth weekly saving is 21 units.

The programme will be adopted only if the common difference is positive but does not exceed 5, so that the weekly increase is manageable. The first weekly saving must also be at least 10 units, and the total amount saved in the first 10 weeks must be at least 200 units.

In another planning activity, the committee uses the equation

$$3\log_t(10+3t) = 6$$

to determine a scale factor $t$. The scale factor will be accepted only if $t > 1$ and $t \leq 6$.

**Task**

As a mathematics student, use mathematical justification to help the school welfare committee decide whether:

(a) the weekly savings increase should be approved by finding the common difference and checking whether it is positive and not greater than 5;

(b) the savings programme should be adopted by finding the first term and the sum of the first 10 terms, then checking whether the starting amount and total savings meet the required limits;

(c) the planning scale factor should be accepted by solving $3\log_t(10+3t) = 6$ and checking whether $1 < t \leq 6$.

Super Platinum Submarks Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731
DOWNLOAD SHULE APP FROM 8
Google play App Store
LEARN AT YOUR CONVENIENCE

CamScanner

# SECTION B PART II: DATA ANALYSIS AND PROBABILITY

## Item 12

A school academic committee is comparing the performance of 10 students, labelled $A$ to $J$, in Mathematics and Physics tests. The scores are shown in the table below.

| Student | $A$ | $B$ | $C$ | $D$ | $E$ | $F$ | $G$ | $H$ | $I$ | $J$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Mathematics ($x$) | 28 | 20 | 40 | 28 | 21 | 31 | 36 | 29 | 33 | 24 |
| Physics ($y$) | 30 | 20 | 40 | 28 | 22 | 35 | 35 | 27 | 31 | 23 |

The committee wants to use the relationship between Mathematics and Physics scores to guide learner support. A student who scores 37 in Physics will be advised on the expected Mathematics performance using a line of best fit. The relationship will be considered useful only if the rank correlation coefficient shows a strong positive association.

In a related agricultural science project, the masses of animals on a school demonstration farm are normally distributed with mean 60 kg and variance 25 kg$^2$. The farm manager wants to know the percentage of animals weighing at least 52.5 kg. The feeding plan will be maintained only if at least 90% of the animals weigh 52.5 kg or more.

During a school educational tour, a traveller compares the price index for breakfast ($B$), lunch ($L$), and supper ($S$) in Kampala and Mbarara. The price indices are shown below.

| Town | Breakfast ($B$) | Lunch ($L$) | Supper ($S$) |
|---|---|---|---|
| Kampala | 120 | 130 | 125 |
| Mbarara | 115 | 135 | 110 |

The actual quantities consumed by the traveller for breakfast, lunch, and supper are 300 g, 400 g, and 300 g, respectively. The school will recommend the cheaper town for meals if its weighted index is lower.

**Task**

As a mathematics student, use mathematical justification to help the school academic committee, farm manager, and tour organisers decide whether:

(a) learner support should be planned using the scatter diagram by drawing a line of best fit and estimating the Mathematics score of a student who scored 37 in Physics;

(b) the Mathematics–Physics relationship and the farm feeding plan should be accepted by calculating the rank correlation coefficient and checking whether at least 90% of the animals weigh 52.5 kg or more;

(c) the cheaper meal town should be recommended by calculating the weighted price index for Kampala and Mbarara using the given quantities.

## Item 13

A local newspaper company is reviewing its weekly sales performance over a period of 12 weeks. The sales, in thousands of copies, are shown in the table below.

Super Platinum Submaths Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731 DOWNLOAD SHULE APP FROM Google play App Store LEARN AT YOUR CONVENIENCE



CamScanner

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of copies sold | 315 | 378 | 490 | 430 | 510 | 580 | 565 | 595 | 640 | 660 | 628 | 670 |

The company wants to smooth the weekly sales using 3-week moving averages and then plot both the original sales and the moving averages on the same axes. The manager will increase printing for week 13 only if the graph suggests that expected sales are at least 650 thousand copies.

In the same company, a promotional gift is given to customers using a random variable $X$, whose probability distribution is

$$P(X = x) = \begin{cases} \frac{x}{10}, & x = 1, 2, 3, \\ 0, & \text{elsewhere.} \end{cases}$$

The promotion will be maintained only if the expected value of $X$ is at least 1.4.

The company also tests 8 trainee sales agents and obtains the marks

$$5,\ 9,\ 11,\ 15,\ 19,\ 15,\ 10,\ 14.$$

The training programme will be considered effective only if the mean mark is at least 12 and the variance is not more than 18.

**Task**

As a mathematics student, use mathematical justification to help the newspaper company decide whether:

(a) printing should be increased for week 13 by calculating the 3-week moving averages, plotting them with the original sales, and checking whether the expected sales are at least 650 thousand copies;

(b) the promotional gift system should be maintained by finding $P(1 \leq X < 3)$ and checking whether $E(X) \geq 1.4$;

(c) the trainee sales programme should be accepted by calculating the mean and variance of the marks, then checking whether the mean is at least 12 and the variance is not more than 18.

## Item 14

A factory produces animal food packed in bags. The weights of the bags are normally distributed with mean 50 kg and standard deviation 2.8 kg. For quality control, the factory wants to know the probability that a randomly selected bag weighs more than 52 kg, lies between 46 kg and 55 kg, and weighs less than 54 kg. The packaging process will be accepted only if the percentage of bags weighing less than 54 kg is at least 90%.

In a school students' council, there are 7 girls and 5 boys. Two students are selected at random to represent the council at a meeting. The selection process will be considered fair only if the probabilities of selecting two girls and selecting a boy first followed by a girl can be determined clearly.

In another institution, the enrolment of students over five years is shown below.

| Year | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| Number of students | 145 | 182 | 170 | 155 | 213 |

The institution uses three-year moving averages to monitor enrolment trends. It will plan for expansion in 2008 if the enrolment for 2008, found using the fourth moving average of 203, is more than 230 students.

Super Platinum Submaths Collections - 0757373064

FOR MORE INFO: 0767 936 724 0767 936 728 0767 936 725 0767 936 731
DOWNLOAD SHULE APP FROM Google play App Store
LEARN AT YOUR CONVENIENCE



CamScanner

**Task**

As a mathematics student, use mathematical justification to help the factory, students' council, and institution decide whether:

(a) the packaging process should be approved by finding the required normal-distribution probabilities and checking whether at least 90% of the bags weigh less than 54 kg;

(b) the council selection process should be considered clear and fair by finding the probabilities of selecting two girls and selecting a boy first followed by a girl;

(c) the institution should plan for expansion in 2008 by calculating the three-year moving averages and checking whether the projected enrolment is more than 230 students.

## Item 15

A farm manager is studying the weights, in kilograms, of 50 cattle on a farm. The weights recorded are:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 60 | 81 | 76 | 68 | 84 | 112 | 76 | 102 | 86 | 67 |
| 65 | 98 | 107 | 110 | 72 | 99 | 87 | 92 | 76 | 77 |
| 94 | 102 | 87 | 86 | 73 | 118 | 98 | 120 | 62 | 87 |
| 65 | 92 | 104 | 116 | 91 | 93 | 78 | 122 | 102 | 92 |
| 80 | 111 | 73 | 120 | 106 | 123 | 94 | 109 | 80 | 96 |

The manager wants to group the data using equal class intervals starting with $60 - 69$, and then draw an ogive to study the distribution of cattle weights. The feeding programme will be reviewed if the median weight is below 90 kg, or if fewer than 10 cattle weigh 118 kg and above.

In another section of the farm, it was observed that 3 seeds in every 4 seeds planted germinate. If 16 seeds are planted, the farm manager wants to estimate the expected number of seeds that will germinate and the probability that exactly 14 seeds will germinate. The planting method will be maintained if the expected number of seeds germinating is at least 12.

The farm also supports a university student whose expenditures in 2005 and 2006 are shown below.

| Item | 2005 | 2006 | Weight |
|---|---|---|---|
| Text books | 100000 | 120000 | 3 |
| Pocket money | 50000 | 70000 | 2 |
| Research | 40000 | 50000 | 1 |

Using 2005 as the base year, the sponsor wants to calculate the weighted aggregate price index. The student allowance will be increased if the weighted aggregate price index is greater than 120.

**Task**

As a mathematics student, use mathematical justification to help the farm manager and sponsor decide whether:

(a) a grouped frequency table and an ogive can be formed from the cattle weights, and whether the median weight and the number of cattle weighing 118 kg and above satisfy the feeding-programme conditions;

Super Platinum Subjects Collections - 0757373064



CamScanner

(b) the expected number of seeds that will germinate and the probability that exactly 14 seeds will germinate can be determined, and whether the planting method should be maintained;

(c) the weighted aggregate price index can be calculated using 2005 as the base year, and whether the student allowance should be increased.

Super Platinum Submaths Collections - 0757373064

CamScanner

**S475/1**

**SUBSIDIARY**

**MATHEMATICS**

**Paper 1**

**July 2026**

$2\,1/2$ hours

**UGANDA ADVANCED CERTIFICTE OF EDUCTION**

**S.6 INTERNAL MOCKS EXAMINATION**

**SUBSIDIARY MATHEMATICS**

**PAPER 1**

**2 hours 30 minutes**

**INSTRUCTIONS TO CANDIDATES:**

*This examination paper consists of two sections; **A** and **B**. It has six examination items.*

*Section **A** consists of **two compulsory** items.*

*Section **B** has two parts, **I** and **II** each with two optional items. Respond to only **two** items from Section **B**, choosing **one** item from **each** of the parts, **I** and **II**.*

*Respond to **four** items in all.*

*Any additional item(s) responded to will **not** be scored.*

*Begin each item on a fresh page.*

***All** necessary working **must** be shown clearly.*

*Graph paper is provided.*

*Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

*@ Daniel Danielles Dannie 0753436643*

Super Platinum Submaths Collections - 0757373064

## SECTION A

*All items in this section are* **compulsory**.

### Item 1

Martin has a garden of tomatoes he wishes to irrigate. He plans to place water nozzles at the extreme corners A(10,20) and B(30,40) and a third nozzle at point M(20,20). His water tank will stand at corner W(45,52). He will proceed with this setup if the angle between WM and AB is acute, which guarantees enough pressure. Also the length of the pipe AB should be more than 5metres.

Martin measures the angle of elevation to the top of the water stand as $32^0$ from the level ground. He walks 50m closer to the water stand and the angle of elevation increases to $55^0$. He must find the height of the water stand onto which to mount the tank.

**Task**

Help Martin to analyze the information and make meaningful decision.

### Item 2

A compound designer is required to design a flower garden for planting different types of flowers. He has modelled the flower garden to take on a flat boundary on one side and the other boundary to take the form of curve modelled by $y = -x^2 + 6x$. The designer is required to come up with the sketch of the flower garden and calculate the area that will be covered by the garden.

**Task**

Help the designer sketch the flower garden and calculate the area that will be covered by the garden.

Super Platinum Submaths Collections - 0757373064

## *SECTION B*

*Respond to only **two** items from this section, choosing **one** item from each of the parts **I** and **II.***

## PART I

### Item 3

A young entrepreneur in one of the cities in Uganda is reviewing her new diary processing business. She needs help to decide whether to expand her factory space based on her weekly yoghurt sales to schools and supermarkets. Her weekly profit (in thousand of UGX) is modelled by; $P(x) = -x^2 + 10x - 16$, were $x$ is the number of hundred litres of yoghurt made. She will only proceed with the expansion if her maximum possible weekly profit exceeds UGX 15000.

For her to buy new packing machine, she saves UGX 150,000 in the first month and increases this amount by UGX 30,000 every month. The machine she needs costs UGX 3,000,000 but she does not know whether she will get that money by the end of 10 months.

Furthermore she needs to choose 3 packaging workers from 8 job seekers consisting of 5men and 3 women. Her selection must include at least one woman. She needs to know the possible number of ways she can make these selections.

**Task**

Help the young entrepreneur to solve her challenges

### Item 4

A bakery in a certain town is expanding its bread production to meet the increasing demand and has been given a contract to produce and supply 690 trays of bread to a supermarket within 10 days.

*@ Daniel Danielles Dannie 0753436643*

Super Platinum Submaths Collections - 0757373064

To fulfil the contract, the bakery has started by producing 6 trays of bread on the first day, will produce 9 trays on the second day, 12 trays on the third day and the bread production will keep increasing by the same constant number of trays each subsequent day.

The bakery manager wants to determine how long it will take to fulfil the contract if production continues to increase in the same pattern.

The bakery produces 6 different types of bread. A nearby shop wants to order for 3 different types of bread, however, the shopkeeper does not know the different possible number of selections to choose from if the order in which the types are chosen does not matter.

**Task:**

(a) (i) Assess whether the production pattern will enable the manager to fulfil the contract.

(ii) Recommend an alternative production pattern for the manager to fulfil the contract, assuming that 6 trays are produced on the first day.

(b) Determine the number of possible bread type selections the shopkeeper can choose from.

## PART II.

**Item 5**

The head teacher of a boarding school is evaluating the school's feeding program for next term amidst changing market conditions. She collected price data for four foundational food groups used in the school kitchen for Term 1 and term 2. She needs help to know if the cost of the living has increased in order to enhance on the budget for next term.

Super Platinum Submaths Collections - 0757373064

| Food group | Term 1 price (UGX) | Term 2 price (UGX) | Weight |
|---|---|---|---|
| Maize flour | 2500 | 3200 | 120 |
| Beans | 3500 | 4000 | 80 |
| Rice | 4500 | 5200 | 50 |
| Sugar | 4000 | 4800 | 30 |

The school clinic distributes glucose packets (x) to weak students during sports days. The table below shows the chance of a student getting each number of packets.

| Number of packets (x) | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Chances $P(X= x)$ | c | 2c | 3c | 0.4 |

The headteacher will add more glucose to the school clinic if the standard deviation is less than 2.

**Task**

Help the headteacher with her concerns.

**Item 6**

A retail shop in Kampala City sells T-shirts, pairs of trousers and pairs of shoes. At the end of every week, the shop owner prepares a business report to guide restocking, pricing and staff deployment for the following week. However, during a system upgrade, the electronic pricing records were accidentally deleted, leaving only the quantities of items sold and the total sales collected over three consecutive business days. The available records show that on Monday, the shop sold 8 T-shirts, 5 pairs of trousers and 4 pairs of shoes, collecting UGX 340,000. On Tuesday, it sold 12 T-shirts, 7 pairs of trousers and 10 pairs of shoes, collecting UGX 660,000. On Wednesday, it sold 10 T-shirts, 4 pairs of



Super Platinum Submaths Collections 0757373064

trousers and 5 pairs of shoes, earning UGX 380,000. The retail shop has received an order from a customer to deliver 15 T- shirts, 12 pairs of trousers and 8 pairs of shoes.

The shop owner also recorded the arrival times, in minutes after 11:10 a.m., of a random sample of customers over the same period as follows:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | 18 | 20 | 22 | 17 | 25 | 23 | 28 | 26 | 21 |
| 30 | 33 | 35 | 32 | 36 | 39 | 42 | 37 | 41 | 28 |
| 45 | 48 | 29 | 31 | 26 | 27 | 30 | 33 | 34 | 31 |
| 28 | 35 | 40 | 42 | 37 | 39 | 36 | 38 | 29 | 43 |
| 46 | 47 | 30 | 32 | 31 | 45 | 27 | 44 | 46 | 49 |
| 52 | 53 | 55 | 51 | 50 | 56 | 57 | 58 | 59 | 51 |

Basing on the shop's customer service policy, additional sales attendants should be deployed during the period when most customers usually arrive. Before implementing this policy, the shop owner needs to identify the period during which customers most commonly arrive at the shop.

**Tasks**

a) Help the owner of the retail shop to determine the total earnings he will get after delivering the order to the customer.
b) With justification, suggest the appropriate time period when the shop owner should deploy additional sales attendants.

**END**

Super Platinum Submaths Collections - 0757373064

S475/1
SUBSIDIARY
MATHEMATICS
Paper 1
July 2026
$2\frac{1}{2}$ hours

# ACEITEKA JOINT MOCK EXAMINATIONS 2026

## Uganda Advanced Certificate of Education

## SUBSIDIARY MATHEMATICS

## PAPER 1

**Time: 2 hours 30 minutes**

*INSTRUCTIONS TO CANDIDATES:*

*This examination paper consists of two sections; A and B.*

*It has **six** examination items.*

*Section A has two compulsory items.*

*Section B has two parts; I and II. Respond to only one item from **each** part.*

*All responses must be written in the answer booklet(s) provided.*

*Graph paper is provided.*

*Use silent, non-programmable scientific calculators and mathematical tables.*

Super Platinum Submaths Collections - 0757373064

## SECTION A

**ITEM 1**

A civil engineering team in **a certain District** is installing an underground water pipeline in a newly planned residential area.

The two main water source are located at point P(3,1) and Q(-1,-3)

To regulate water pressure , the engineers plan to install a monitoring device at the midpoint of the two main water source.

However, for safety and efficiency:

- The device must be connected to a control centre at O(0,0) ) using a cable.
- Engineers are concerned about the angle between the pipeline direction connecting the water source Q and the device.

If the angle is more than the acute, signal transmission is considered inefficient

**Task:**

**(a)** Use mathematical justification, advise the engineers

**ITEM 2**

A farmer visited an agricultural exhibition and learned about a modern irrigation system designed to address the challenge of insufficient water supply .
The irrigation system supplies water to crops at a rate modeled by:

$R(t) = 12t - 3t^2$ litres per hour,
where t is the time in hours and R(t) is the rate of water supply.

For successful irrigation, the maximum rate at which water is supplied should exceed 10 litres per hour.
However, the amount of water stored in the reservoir at the farmer's farm decreases over time due to leakage from the storage tank. The rate of change of the amount of water in the tank is proportional to the amount of water remaining .

Initially, the tank contained 1,000 litres of water. After one hour, the amount of water in the tank had decreased by 20 litres due to leakage. The farmer wishes to estimate the amount of water that will remain in the tank after 3 hours.

Super Platinum Subm aths Collections 0757373064

If the amount of water remaining after 3 hours is less than 950 litres, the farmer will reduce the opening of the tank tap to minimize further water loss.

**Task:**

Use mathematical calculations to advise the farmer.

## SECTION B

**This section has two parts, I and II**

### PART I

**Respond to only one item in this part.**

**ITEM 3**

A group of five Senior Two students in a certain school developed a natural hair product as their Biology project. However, they lacked sufficient knowledge to estimate the shelf life of the product before it expires. Some Senior Six students tested the product and advised that its shelf life is modeled by the equation:

$3^{2x} - 4(3^x) = -3$

where x represents the shelf life of the product in years.

The group plans to produce at least 300 pieces of the product if the shelf life exceeds 2 years.

The group was later allowed to supply the product to the school canteen. The demand for the product increased by a constant number of pieces each week. Records showed that 27 pieces were supplied in the seventh week and 47 pieces in the twelfth week. The group intends to undertake mass production to satisfy the demand up to the thirty-sixth week. However, if the total number of products required exceeds 2,630, the group will recruit additional workers to support production and supply.

The school administration also advised the group to form a gender-balanced committee of three members to promote the product outside the school. The group consists of three boys and two girls. The administration prefers a committee-selection arrangement that can be made in at most five different ways. If the number of possible selections exceeds five, the school administration will appoint the committee members instead.

**Task:**

Using mathematical justifications, Advise;

(a) The group.

(b) The administration

Super Platinum Submaths Collections - 0757373064

**ITEM 4**

A certain community in your village is experiencing increasing demand for clean water. To improve water supply, the district council plans to install solar panels to power a water pumping system.

During the planning , engineers established that:

- The product of the two possible numbers of solar panels that can effectively operate the system is 72.
- The sum of the two possible numbers of solar panels is 18.

The council needs to determine the possible numbers of solar panels that can be installed. The engineer advised that the project will only be considered possible if the required number of solar panels is at least 6 but not more than 15.

To meet future demand, the district plans to add water storage tanks annually. The number of tanks added each year doubles compared to the number added in the previous year.

In the first year, 4 tanks will be added. In the second year, 8 tanks will be added, followed by 16 tanks.

The council intends to continue the program until the cumulative number of tanks installed reaches 508. However, if the time required to achieve this target exceeds 5 years, the council will not provide funding for the upgrading of the existing water supply system.

To maximize solar energy production, council has purchased six solar panels labelled **A, B, C, D, E,** and **F.** Due to limited space on the mounting frame, only **four panels** can be installed in the first row. The order in which the panels are arranged affects the efficiency of power collection and maintenance operations.

The council therefore need to determine the number of different ways in which four panels can be arranged from the six available panels. If the number of possible arrangements exceeds **300,** a computer simulation will be used to identify the most efficient arrangement.

**Task:**

Based on mathematical validation, help the district council to make recommendations.

Super Platinum Submaths Collections 0757373064

## PART II

*Respond to only one item in this part*

**ITEM 5**

The canteen committee of a certain school recently introduced a new product. The administration is however not comfortable with the new product and has decide to carry out a survey. It got views from representatives of all the thirty streams in school. The learners were asked to rate the new product on a scale of 1-5 and the information summarized in the table below.

| Scale | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| No. Of Students | 2 | 8 | 12 | 5 | 3 | |

If the variance is greater than 1, the administration will direct the committee to stop selling the new item.

The school administration further wants to compare the sales at the canteen over the past 9 terms as shown in the table below, on a quarterly basis.

| TERM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| SALES(In millions) | 60 | 84 | 42 | 72 | 64 | 86 | 42 | 74 | 67 |

If the estimated sales in the **$10^{th}$ term** are greater than UGX. **70 million shillings,** the school will consider renewing the contract of the committee for two more years.

Additionally, the canteen is opened thrice a day. However the teacher in charge of meals has complained that most students have only 2 out of the four meals given by the school, leading to food wastage. He gives his finding below as proof of his claims.

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| P(X=x) | 0.16 | 0.35 | 0.41 | 0.08 |

Where x represents the number of meals had, and P(X=x) represents the respective probabilities. If the expected number of meals had is less the 3, the canteen will be opened only twice a day.

Super Platinum Submaths Collections - 0757373064

Some teachers have also complained that students go late to class because they delay at the canteen. The probability that a learner is late for class is 0.25. A sample of 20 learners is investigated and If the probability of at least 8 of them are late is greater than 0.5, the school will recommend that the canteen opens only once a day.

**Task:**

Basing on numerical evidence, help the school administration to make appropriate decisions.

**ITEM 6**

An agricultural officer is evaluating the productivity of coffee farmers in a selected farming community in order to improve agricultural support programs. During a harvest season, the masses of coffee harvested were recorded as shown in the below.

| MASS (KG) | 10 – 14 | 15 – 19 | 20 – 24 | 25 – 29 | 30 – 34 |
|---|---|---|---|---|---|
| NUMBER OF BAGS | 4 | 6 | 10 | 12 | 8 |

The agricultural officer believes that the variation in production is manageable if the variance does not exceed 30.

The table below shows the amount of fertiliser used and the corresponding coffee yield obtained from selected farms.

| Fertiliser Used (kg) | 2 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|
| Coffee Yield (bags) | 15 | 18 | 22 | 25 | 28 | 32 |

The agricultural officer will encourage appropriate fertiliser use if the estimated coffee yield, when 9 kg of fertiliser is used, exceeds 30 bags.

In the same community, the probability that a farmer uses improved seeds is 0.7, while the probability that a farmer uses irrigation is 0.5.

These events are considered to be independent. The agricultural officer will encourage farmers to adopt both practices in order to improve agricultural productivity if the probability that a farmer uses both practices does not exceed 0.40.

Super Platinum Submaths Collections - 0757373064

The office also recorded the daily amount of coffee (in tonnes) processed by a coffee factory as a continuous random variable, X, with probability density function:

$$f(x) = kx^2, \text{ for } 0 \leq x \leq 4$$

**and**

$$f(x) = 0, \text{ elsewhere.}$$

The agricultural officer will encourage the expansion of coffee processing activities if the expected daily amount of coffee processed exceeds 2.5 tonnes.

**Task:**

Use mathematical justifications to advise the officer.

**END**

Super Platinum Submaths Collections - 0757373064









# THE UGANDA INTER SCHOOL VIRTUAL A LEVEL SUBSIDIARY MATHEMATICS SEMINAR 2026.

## Sunday $19^{th}$ July 2026 (2:00 p.m)

**INSTRUCTIONS TO STUDENTS AND TEACHERS:**

Dear students and teachers we would like to welcome you to participate in the forthcoming Mathematics seminar for senior six students. This is in preparation for the forthcoming final exams(UNEB) and the Mock Examinations. **This is a free seminar and no one should charge you any fees**.The process to be followed by both the teachers and students is suggested below:

1. Teachers share the Seminar questions with their students and ask for volunteers to discuss any of the questions. Questions should be pinned up and learners write down all the questions in their books.
2. Teachers talk to the school administrators to allow the children participate as presenters in the seminar on Sunday **19th July from 02:00pm - 5:00 pm.** Other students will just be participants.
3. The student together with the teachers select atleast two best done presentations and the students to represent the school.The solutions and pictures/videos should be uploaded on padlet and on email kazibastephen42@gmail.com
4. Hold a mock presentation where all your discussants present to the rest of the class.After that release the rest of the class and record your best presenter in a very quiet environment but with good light.Record each part of the question separately .
5. The teacher could now train the student on how to present on zoom as far as sharing a screen and using the whiteboard. Alternatively the students' presentation will be loaded on the computer screen and they explain to us their solution.

**SEMINAR DETAILS**

S.6 virtual Subsidiary Mathematics seminar 2026.

**Time**: 19th July 2026, 02:00 PM

Join Zoom Meeting
https://zoom.us/j/91431890672?pwd=1ixO0GDL7Vf0ncblsOiMEA4pqZHAGn.1
**Meeting ID**:914 3189 0672
**Passcode**: HeLP

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

| Construct | Topics |
|---|---|
| Geometry | 1. Trigonometry<br>2. Vectors |
| Calculus | 1. Differentiation<br>2. Integration<br>3. Differential equations |
| Algebra | 1. Numerical concepts<br>2. Quadratics<br>3. Permutations and combinations<br>4. Series |
| Data analysis and probability | 1. Matrices<br>2. Descriptive statistics<br>3. Correlation and Scatter diagrams<br>4. Probability theory<br>5. Random variables<br>6. Probability distributions<br>7. Time series analysis |

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

## COORDINATE GEOMETRY

1. A telecommunications company is installing a temporary communication mast to provide reliable mobile network coverage during a national agricultural exhibition. The base of the mast is represented on a coordinate plane by the point O$(0, 0)$. Two support cables have already been attached from the top of the mast to ground anchor points A$(-50, -30)$ and B$(30, -40)$. According to the company's engineering standards, an additional support cable should only be installed if the angle between the two existing support cables exceeds $60^0$. For effective signal transmission, the transmitting antenna mounted on the mast should be inclined at an acute angle, x, to the horizontal satisfying the mathematical relationship

$$2\sin^2 x - \cos x = 1$$

Before the communication mast is commissioned, the engineers need to establish whether the existing support system satisfies the required safety standard and determine the angle at which the transmitting antenna should be mounted to provide reliable network coverage.

**Task**

Basing on calculations, with justification(s), provide the guidance needed by the engineers.

## CALCULUS

2. A furniture manufacturing company in Jinja supplies office furniture to schools and other institutions. The management has observed that increasing production does not always increase profit because production and operating costs also increase. After analysing the company's production records, the weekly profit, P, in million Uganda shillings, was modelled by

$$P(x) = -0.9x^2 + 52x - 360$$

, where x is the number of hundreds of furniture units produced and sold each week. The management plans to increase production before the beginning of the new school term. During a management meeting, they need to make a detailed analysis of the model, including representing it graphically with a clear interpretation of the turning point and intercepts, so that they can determine the production level that gives the highest weekly profit and identify the production levels at which the company makes a profit.

Recently, the company introduced an online ordering system to increase its customer base. At the beginning of the marketing campaign, the company had 500 active online customers. The marketing team observed that the rate at which the number of active online customers increased was proportional to the number of active customers at any given time, with a proportionality constant of 0.15 per week. The marketing manager needs to estimate the number of active online customers after 8 weeks.

**Task**

(a) Make the detailed analysis needed by the management during the meeting.

(b) Address the need of the marketing manager.

Super Platinum Submaths Collections - 0757379064


All Rights Reserved

## ALGEBRA

3. Aisha has been employed by a commercial bank and plans to save money every month for the next 48 months to raise a deposit for purchasing a house. She intends to save UGX 300,000 during the first month and increase her monthly savings by UGX 5,000 every succeeding month.

   The house she intends to purchase requires a deposit of UGX 18,000,000. Before starting the savings plan, Aisha needs to establish whether the proposed savings pattern will enable her to raise the required deposit within the planned period. She also needs to determine the amount she will be saving during the twelfth month.

   As part of preparing the house for occupation, Aisha plans to furnish the dining room. A furniture showroom has eight different dining chair designs. She intends to buy three different chair designs but is unsure of the number of possible selections she can make if the order of selection does not matter.

   **Task**

   (a) Make the assessment needed by Aisha regarding her savings plan.

   (b) Address Aisha's need regarding the furniture selection.

## DATA AND PROBABILITY

4. A retail shop in Kampala City sells T-shirts, pairs of trousers and pairs of shoes. At the end of every week, the shop owner prepares a business report to guide restocking, pricing and staff deployment for the following week. However, during a system upgrade, the electronic pricing records were accidentally deleted, leaving only the quantities of items sold and the total sales collected over three consecutive business days. The available records show that on Monday, the shop sold 8 T-shirts, 5 pairs of trousers and 4 pairs of shoes, collecting UGX 340,000. On Tuesday, it sold 12 T-shirts, 7 pairs of trousers and 10 pairs of shoes, collecting UGX 660,000. On Wednesday, it sold 10 T-shirts, 4 pairs of trousers and 5 pairs of shoes, earning UGX 380,000.

   The shop owner also recorded the arrival times, in minutes after 11:10 a.m., of a random sample of customers over the same period as follows:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | 18 | 20 | 22 | 17 | 25 | 23 | 28 | 26 | 21 |
| 30 | 33 | 35 | 32 | 36 | 39 | 42 | 37 | 41 | 28 |
| 45 | 48 | 29 | 31 | 26 | 27 | 30 | 33 | 34 | 31 |
| 28 | 35 | 40 | 42 | 37 | 39 | 36 | 38 | 29 | 43 |
| 46 | 47 | 30 | 32 | 31 | 45 | 27 | 44 | 46 | 49 |
| 52 | 53 | 55 | 51 | 50 | 56 | 57 | 58 | 59 | 51 |

   Basing on the shop's customer service policy, additional sales attendants should be deployed

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

during the period when most customers usually arrive. Before implementing this policy, the shop owner would like to establish the selling price of each product and identify the period during which customers most commonly arrive at the shop.

**Task**

Basing on calculations, with justification(s), provide the guidance needed by the shop owner.

5. A telecommunications company wishes to compare the monthly sales of mobile phones at its Kampala and Mbarara service centres. It records the number of mobile phones sold each month at the two service centres. This is a table of its results.

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kampala | 52 | 37 | 66 | 45 | 77 | 27 | 80 | 19 | 47 | 40 |
| Kampala | 80 | 75 | 81 | 76 | 77 | 49 | 84 | 50 | 63 | 64 |

The sales manager needs to use the information to establish:

- The service centre with more consistent monthly mobile phone sales.
- The relationship between the monthly sales at the two service centres.
- The expected number of mobile phones that would be sold at the Mbarara service centre if 60 mobile phones were sold at the Kampala service centre, and hence the implication of this estimate on future sales planning.

**Task**

Generate the information the sales manager shall give to the company.

6. A telecommunications company operates three customer service desks labelled A, B and C. Customers arriving at the service centre are assigned to one of the three desks at random. The duration of a customer consultation, T, measured in minutes, for a randomly selected customer is modelled by the probability density function

$$f(t) = \begin{cases} kt, & 0 \leq t \leq 12, \\ 0, & \text{otherwise.} \end{cases}$$

To improve customer satisfaction, the company wishes to determine the likelihood that a consultation lasts more than 8 minutes.

At the end of each consultation, every customer is randomly assigned one of three feedback forms labelled A, B and C. Form A contains one positive response and two negative responses, Form B contains two positive responses and one negative response, while Form C contains three positive responses. Each customer selects one response at random. The customer care manager needs to use the probability model to assess consultation times and the feedback data to evaluate customer satisfaction.

**Task**

Address the needs of the customer care manager.

**END**

Super Platinum Submaths Collections - 0757573064


All Rights Reserved









# THE UGANDA INTER SCHOOL VIRTUAL A LEVEL SUBSIDIARY MATHEMATICS SEMINAR 2026.

## Sunday $19^{th}$ July 2026 (2:00 p.m)

**INSTRUCTIONS TO STUDENTS AND TEACHERS:**

Dear students and teachers we would like to welcome you to participate in the forthcoming Mathematics seminar for senior six students. This is in preparation for the forthcoming final exams(UNEB) and the Mock Examinations. **This is a free seminar and no one should charge you any fees**.The process to be followed by both the teachers and students is suggested below:

1. Teachers share the Seminar questions with their students and ask for volunteers to discuss any of the questions. Questions should be pinned up and learners write down all the questions in their books.
2. Teachers talk to the school administrators to allow the children participate as presenters in the seminar on Sunday **19th July from 02:00pm - 5:00 pm.** Other students will just be participants.
3. The student together with the teachers select atleast two best done presentations and the students to represent the school.The solutions and pictures/videos should be uploaded on padlet and on email kazibastephen42@gmail.com
4. Hold a mock presentation where all your discussants present to the rest of the class.After that release the rest of the class and record your best presenter in a very quiet environment but with good light.Record each part of the question separately .
5. The teacher could now train the student on how to present on zoom as far as sharing a screen and using the whiteboard. Alternatively the students' presentation will be loaded on the computer screen and they explain to us their solution.

**SEMINAR DETAILS**

S.6 virtual Subsidiary Mathematics seminar 2026.

**Time**: 19th July 2026, 02:00 PM

Join Zoom Meeting
https://zoom.us/j/91431890672?pwd=1ixO0GDL7Vf0ncblsOiMEA4pqZHAGn.1
**Meeting ID**:914 3189 0672
**Passcode**: HeLP

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

| Construct | Topics |
|---|---|
| Geometry | 1. Trigonometry<br>2. Vectors |
| Calculus | 1. Differentiation<br>2. Integration<br>3. Differential equations |
| Algebra | 1. Numerical concepts<br>2. Quadratics<br>3. Permutations and combinations<br>4. Series |
| Data analysis and probability | 1. Matrices<br>2. Descriptive statistics<br>3. Correlation and Scatter diagrams<br>4. Probability theory<br>5. Random variables<br>6. Probability distributions<br>7. Time series analysis |

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

## COORDINATE GEOMETRY

1. A telecommunications company is installing a temporary communication mast to provide reliable mobile network coverage during a national agricultural exhibition. The base of the mast is represented on a coordinate plane by the point O$(0, 0)$. Two support cables have already been attached from the top of the mast to ground anchor points A$(-50, -30)$ and B$(30, -40)$. According to the company's engineering standards, an additional support cable should only be installed if the angle between the two existing support cables exceeds $60^0$. For effective signal transmission, the transmitting antenna mounted on the mast should be inclined at an acute angle, x, to the horizontal satisfying the mathematical relationship

$$2\sin^2 x - \cos x = 1$$

Before the communication mast is commissioned, the engineers need to establish whether the existing support system satisfies the required safety standard and determine the angle at which the transmitting antenna should be mounted to provide reliable network coverage.

**Task**

Basing on calculations, with justification(s), provide the guidance needed by the engineers.

## CALCULUS

2. A furniture manufacturing company in Jinja supplies office furniture to schools and other institutions. The management has observed that increasing production does not always increase profit because production and operating costs also increase. After analysing the company's production records, the weekly profit, P, in million Uganda shillings, was modelled by

$$P(x) = -0.9x^2 + 52x - 360$$

, where x is the number of hundreds of furniture units produced and sold each week. The management plans to increase production before the beginning of the new school term. During a management meeting, they need to make a detailed analysis of the model, including representing it graphically with a clear interpretation of the turning point and intercepts, so that they can determine the production level that gives the highest weekly profit and identify the production levels at which the company makes a profit.

Recently, the company introduced an online ordering system to increase its customer base. At the beginning of the marketing campaign, the company had 500 active online customers. The marketing team observed that the rate at which the number of active online customers increased was proportional to the number of active customers at any given time, with a proportionality constant of 0.15 per week. The marketing manager needs to estimate the number of active online customers after 8 weeks.

**Task**

(a) Make the detailed analysis needed by the management during the meeting.

(b) Address the need of the marketing manager.

Super Platinum Submaths Collections - 0757379064


All Rights Reserved

## ALGEBRA

3. Aisha has been employed by a commercial bank and plans to save money every month for the next 48 months to raise a deposit for purchasing a house. She intends to save UGX 300,000 during the first month and increase her monthly savings by UGX 5,000 every succeeding month.

   The house she intends to purchase requires a deposit of UGX 18,000,000. Before starting the savings plan, Aisha needs to establish whether the proposed savings pattern will enable her to raise the required deposit within the planned period. She also needs to determine the amount she will be saving during the twelfth month.

   As part of preparing the house for occupation, Aisha plans to furnish the dining room. A furniture showroom has eight different dining chair designs. She intends to buy three different chair designs but is unsure of the number of possible selections she can make if the order of selection does not matter.

   **Task**

   (a) Make the assessment needed by Aisha regarding her savings plan.

   (b) Address Aisha's need regarding the furniture selection.

## DATA AND PROBABILITY

4. A retail shop in Kampala City sells T-shirts, pairs of trousers and pairs of shoes. At the end of every week, the shop owner prepares a business report to guide restocking, pricing and staff deployment for the following week. However, during a system upgrade, the electronic pricing records were accidentally deleted, leaving only the quantities of items sold and the total sales collected over three consecutive business days. The available records show that on Monday, the shop sold 8 T-shirts, 5 pairs of trousers and 4 pairs of shoes, collecting UGX 340,000. On Tuesday, it sold 12 T-shirts, 7 pairs of trousers and 10 pairs of shoes, collecting UGX 660,000. On Wednesday, it sold 10 T-shirts, 4 pairs of trousers and 5 pairs of shoes, earning UGX 380,000.

   The shop owner also recorded the arrival times, in minutes after 11:10 a.m., of a random sample of customers over the same period as follows:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | 18 | 20 | 22 | 17 | 25 | 23 | 28 | 26 | 21 |
| 30 | 33 | 35 | 32 | 36 | 39 | 42 | 37 | 41 | 28 |
| 45 | 48 | 29 | 31 | 26 | 27 | 30 | 33 | 34 | 31 |
| 28 | 35 | 40 | 42 | 37 | 39 | 36 | 38 | 29 | 43 |
| 46 | 47 | 30 | 32 | 31 | 45 | 27 | 44 | 46 | 49 |
| 52 | 53 | 55 | 51 | 50 | 56 | 57 | 58 | 59 | 51 |

   Basing on the shop's customer service policy, additional sales attendants should be deployed

Super Platinum Submaths Collections - 0757373064


All Rights Reserved

during the period when most customers usually arrive. Before implementing this policy, the shop owner would like to establish the selling price of each product and identify the period during which customers most commonly arrive at the shop.

**Task**

Basing on calculations, with justification(s), provide the guidance needed by the shop owner.

5. A telecommunications company wishes to compare the monthly sales of mobile phones at its Kampala and Mbarara service centres. It records the number of mobile phones sold each month at the two service centres. This is a table of its results.

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kampala | 52 | 37 | 66 | 45 | 77 | 27 | 80 | 19 | 47 | 40 |
| Kampala | 80 | 75 | 81 | 76 | 77 | 49 | 84 | 50 | 63 | 64 |

The sales manager needs to use the information to establish:

- The service centre with more consistent monthly mobile phone sales.
- The relationship between the monthly sales at the two service centres.
- The expected number of mobile phones that would be sold at the Mbarara service centre if 60 mobile phones were sold at the Kampala service centre, and hence the implication of this estimate on future sales planning.

**Task**

Generate the information the sales manager shall give to the company.

6. A telecommunications company operates three customer service desks labelled A, B and C. Customers arriving at the service centre are assigned to one of the three desks at random. The duration of a customer consultation, T, measured in minutes, for a randomly selected customer is modelled by the probability density function

$$f(t) = \begin{cases} kt, & 0 \leq t \leq 12, \\ 0, & \text{otherwise.} \end{cases}$$

To improve customer satisfaction, the company wishes to determine the likelihood that a consultation lasts more than 8 minutes.

At the end of each consultation, every customer is randomly assigned one of three feedback forms labelled A, B and C. Form A contains one positive response and two negative responses, Form B contains two positive responses and one negative response, while Form C contains three positive responses. Each customer selects one response at random. The customer care manager needs to use the probability model to assess consultation times and the feedback data to evaluate customer satisfaction.

**Task**

Address the needs of the customer care manager.

**END**

Super Platinum Submaths Collections - 0757573064


All Rights Reserved

S475/1
SUBSIDIARY
MATHEMATICS
Paper 1
2026
2 ½ hours

UGANDA TEACHERS' EDUCATION CONSULT (UTEC)

**Uganda Advanced Certificate of Education**

SUBSIDIARY MATHEMATICS

**Paper 1**

2hours 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

*This examination paper consists of* **two** *sections;* **A** *and* **B**. *It has* **six** *examination items.*

*Section* **A** *consists of* **two** *compulsory items.*

*Section* **B** *has two parts,* **I** *and* **II** *each with* **two** *optional items. Respond to only* **two** *items from Section B, choosing* **one** *item from each of the parts,* **I** *and* **II**.

*Respond to* **four** *items in all.*

*Any additional item(s) responded to will not be scored.*

*Begin each item on a fresh page.*

*All necessary working* **must** *be shown clearly.*

*Graph paper is provided.*

*Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

Super Platinum Submaths Collections - 0757373064

© UTEC 2026 Mock Examinations



CamScanner

## SECTION A

*All items in this section are* **compulsory**

**Item 1**

A certain school in Masaka district is experiencing an unstable power supply from the grid. To resolve this, the school board purchased solar panels to be installed on the roof. However, they wish to know the exact angle at which they should incline the solar panels to maximize the amount of solar energy received. The technician provided them with a model, $Sec\theta - tan\theta = 0$, where $\theta$ is the angle of inclination to the roof.

Additionally, during the inter-house competitions, the games master mapped out key points on the sports pitch as O (0,0), A (2,3), and B (4,5), with coordinates measured in hundreds of meters from the origin. During the race, students are supposed to run from these points and make a U-turn at point O. However, the officials discovered that students were struggling to safely negotiate the corner at point O.

The games master wishes to determine the angle at point O and the total distance the students must cover between those points. This is critical because an athletics consultant advises that the minimum angle for a safe turn in a race should be **95°**, and the distance from the turning point to any other designated point should not be less than **800 m** to meet standard athletic requirements

**Task:**

a) Advise the school board accordingly on the best way to maximize solar energy absorption.

b) Determine whether the games master is meeting the safety and technical requirements for athletics. Justify your answer.

**Item 2**

A fish farmer near Entebbe introduces a population of Tilapia into a newly constructed breeding pond fed by Lake Victoria. Biologists have found that when resources are abundant, the rate at which the fish population (P) grows over time (t, in months) is directly proportional to the number of fish currently in the pond.

The farmer initially stocks the pond with 500 Tilapia, and after 4 months, the population increases to 600. The farmer wishes to determine the population after 12 months because his plan is to enlarge the breeding pond if the population exceeds 900 fish.

Super Platinum Submaths Collections - 0757373064

CamScanner

Additionally, the farmer owns a piece of free land where he wants to construct a new pond covering a surface area of 2,000m², but he is unsure whether the land is large enough. Consequently, he hired an engineer to map the land. During the mapping process, the engineer established a baseline along the lower section of the land (acting as the x-axis) and discovered that the upper boundary of the land is modelled by the function $f(x) = 1 - 2x - x^2$, where $x$ represents the distance in hundreds of meters along the baseline. However, the engineer left before calculating the total area. The farmer would now like to know whether his new pond will fit on this piece of land.

**Task:**

Using mathematical justifications, help the farmer make informed decisions.

## SECTION B

*Respond to only* **two** *items from this section, choosing* **one** *item from each of the parts* **I** *and* **II**.

### Part I

**Item 3**

A hotel in a growing town plan to improve its green park and outdoor relaxation area in order to attract more visitors. To raise funds for this project, the hotel management plans to organize a dinner event at a cost of UGX 4,500,000, where visitors will pay a participation fee to attend.

The expected total funds collected from the event depend on the number of visitors and are modelled by:

$$f(x) = 200x^2 + 12{,}000x + 50{,}000$$

where:

- $x$ is the number of visitors attending the event, an
- $f(x)$ represents the total funds raised.

The management is uncertain about the number of visitors required to attend the dinner in order to cover at least the initial cost.

In addition, the hotel directors have decided to establish a tree plantation near the hotel. This project is expected to increase in value as the trees grow and the area becomes more attractive to visitors.

Super Platinum Submaths Collections - 0757373064

CamScanner

The directors will contribute money to the project over a period of 12 months. In the first month, they will contribute UGX 1,200,000, and the contribution will increase by UGX 50,000 each month.

After 12 months, the total amount collected will be invested in a bank that earns a 10% compound interest rate per year. The directors intend for the fund to grow until it reaches UGX 30,000,000, not exceeding 3years which will be used to fully develop the green park.

**Task:**

a) Establish whether the management will cover the initial cost

b) Will the green park be fully developed. Justify

**Item 4**

Three fresh graduates from Makerere University have launched *Omwenda Digital*, an e-commerce logistics platform operating between Kampala and Entebbe. To optimize their storage, pricing, and staffing for the upcoming peak harvest season, their data analyst models various operations using mathematical structures.

The initial storage volume required at their central hub in Nakawa is determined by a scaling factor. The optimal peak volume V (in cubic meters) satisfies the index equation

$$9^x - 4(3^x) + 3 = 0$$

Where V = $10x$ cubic meters.

the graduates would like to know the maximum possible storage volume such that if it exceeds 40 cubic meters, they plan to lease it.

The daily profit, P (in thousands of Uganda Shillings, UGX), from their Entebbe express route depends on the number of delivery riders, n, deployed per day. The relationship is modelled by the quadratic function:

$$P(n) = -2n^2 + 40n - 50$$

The graduates would wish to determine the optimal number of riders they should deploy to maximize daily profit, and state this maximum profit in UGX.

Additionally, to meet rising demand, *Omwenda Digital* plans to systematically increase its total motorcycle fleet. In the first month, they purchase 12 motorcycles. In each subsequent month, they add a fixed number of 4 motorcycles to the fleet.

The graduates would wish to know number of motorcycles the company will own by the end of the 12th month.

Super Platinum Submaths Collections - 0757373064

CamScanner

The company now employs 8 delivery riders and 5 office staff. Management wishes to form a 5-member Workplace Safety and Compliance Committee to align with Uganda National Bureau of Standards (UNBS) guidelines.
The company would wish to know the number of ways can the committee be selected if it must contain at least 3 delivery riders, if the selections exceed 120 the company will reduce on the number of delivery riders.

**Task:**

Help the *Omwenda Digital*, an e-commerce logistics platform company started by the graduates make informed decisions.

## PART II

**Item 5**

The academic committee at NaalyaSS Namugongo wanted to improve the reading culture of Senior Five students by making them borrow novels and revision books from the school library. A survey was conducted to study their library usage habits and academic performance in the English language.

The study revealed that the probability of a randomly selected student borrowing a novel in a week is 0.65. The probability that a student borrows a novel but does not borrow a revision book is 0.40. In addition, the probability that a student does not borrow any book from the library is 0.15. The school academic committee agreed that if the probability of students borrowing revision books falls below 0.30, remedial reading lessons and library orientation sessions would immediately be introduced.

Furthermore, if the probability of students borrowing at least one type of book is less than 0.50, the school will extend library hours and provide subsidized learning materials.

To further investigate the impact of library usage on performance, the English department collected grouped data of test scores from 50 students who regularly use the library.

Super Platinum Submaths Collections - 0757373064

CamScanner

| Marks | Number of Students (f) |
|---|---|
| 40–49 | 5 |
| 50–59 | 10 |
| 60–69 | 18 |
| 70–79 | 12 |
| 80–89 | 5 |

The academic committee members have agreed that: If both the mean mark and median mark are greater than 65, the reading program will be expanded to lower classes; and if more than 70% of students score below 74 marks, the school will revise teaching methods and increase library engagement activities.

It was discovered that the marks of students were normally distributed and that students who score the top 15% of the marks the academic committee will give them academic envelopes

**Task:**

Guide the academic committee, basing your guidance on mathematical calculations, to make valid decisions.

**Item 6**

Mr. Mukasa operates *"Kasizi Agro-Traders,"* a business that sources Matooke (high-quality cooking bananas) from farmers in Mbarara and Bushenyi, transporting them via trucks to the Kalerwe and Nakasero markets in Kampala

In a given week, Mr. Mukasa buys matooke bunches categorized into two sizes: Medium and Large.

- Mbarara source: 400 Medium bunches, 600 Large bunches.
- Bushenyi source: 500 Medium bunches, 300 Large bunches.

The buying price per bunch from the farmers is Shs 15,000 for Medium and Shs 25,000 for Large. The selling price in Kampala markets is Shs 22,000 for Medium and Shs 38,000 for Large. he would wish to make a profit of more than shs500,000 using matrices so that he can cater so his children's school fees

Additionally, the journey along the Masaka-Kampala highway poses risks. Historical data from the transport logistics office shows that:

Super Platinum Submaths Collections - 0757373064

- The probability of a truck encountering heavy traffic delays at Lukaya is 0.4.
- The probability of a mechanical breakdown is 0.15.
- The probability of experiencing *both* a delay at Lukaya and a mechanical breakdown on the same trip is 0.06.

If the chance that a truck experiences a delay at Lukaya or a mechanical breakdown, but not both is greater than 0.5 he would wish to move at night so that he reduces on the delays

However, Mr. Mukasa dispatches a fleet of 3 delivery trucks to Kampala every Tuesday morning the loading time X is modelled by a probability distribution where x is time hours taken when loading the truck.

$$f(x) = \begin{cases} C(x-1)(5-x), & 0 \leq x \leq 5 \\ 0, & otherwise \end{cases}$$

He would wish to know the expected time taken for all the 3 trucks such that if it exceeds 10hrs he must hire more casual labourers to help him speed up the loading.

Also, the weight of a Large matooke bunch from Mbarara is known to be normally distributed with a mean of 30kg and a standard deviation of 4kg. If Kampala supermarkets only premium-price bunches that fall into the top 5% of weights, Mr. Mukasa would whish to know the minimum weight a bunch must have to qualify for this premium price?

Task

Using mathematical justifications help Mr. Mukasa to make informed decisions

END

Super Platinum Submaths Collections - 0757373064

CamScanner

*S475/1*
*Subsidiary Mathematics*
*Paper 1*
*July / Aug. 2026*
*2 ½ hours*

# *ASSHU ANKOLE JOINT MOCK EXAMINATIONS 2026*

## *Uganda Advanced Certificate of Education*

## SUBSIDIARY MATHEMATICS

## PAPER 1

**Time: 2 HOURS 30 MINUTES**

Super Platinum Submaths Collections - 0757373064

### *INSTRUCTIONS TO CANDIDATES*

- *This paper consists of **two** sections **A** and **B**. it has six examination items*
- *Attempt only **four (4)** items from this paper*
- *Section **A** has **two** compulsory items.*
- *Section **B** has two parts; **part I** and **part II**. Answer only **one** item from each part.*
- *Any additional item(s) answered shall not be scored*
- *All answers **MUST** be written in the answer booklets / sheets provided.*
- *Graph paper is provided.*
- *Silent, Non – programmable calculator and mathematical tables with list of formulae may be used.*

## SECTION A

**ITEM 1**

Mountain hiking and climbing is a popular tourist activity in the mountainous areas of Kigezi.

Of late there has been an increase in cases of hikers getting lost due to poor navigation caused by bad weather.

Two hikers P and Q went for mountain hiking and started from the same point O on their way to the campsite.

Hiker P moved 10km in the direction of $3\boldsymbol{i} + 4\boldsymbol{j}$, while Hiker Q moved 12 km in the direction of $5\boldsymbol{i} + 12\boldsymbol{j}$. After covering these distances, they both lost sight of each other. At this point, they are not sure how far they are from each other.

Meanwhile continuing with their journey, Hiker P saw a beautiful cliff near the campsite. From a point on the level grounds, he measured the angle of elevation to the top of the cliff as $30^0$. After continuing moving along the same level, 50 metres closer in a straight line towards the base of the cliff, the angle of elevation increased to $60^0$. Hiker P became inquisitive and wanted to know the height of the cliff above the ground.

**TASK**

Basing on calculations, with justification(s), Help the hikers to establish how far they are from each other and also the height of the cliff.

**ITEM 2**

In a meeting that was held by leaders of Ankole cattle corridor, members raised a concern of water shortage especially during the months of June – July.

The meeting resolved to contract prime engineering firm to construct a water channel to tap from River Kagera to supply water to this region.

The nature of the required channel is modelled by $\frac{dy}{dx} = 4x^3 - 12x^2 + 4x + 12$

The design engineers specified that to enable proper flow of water, any point along the channel path where gradient is below 12 must be re-inforced with concrete walls.

The engineering firm identified three points along the channel path located at coordinates A(0, 5), B(3, –4) and C(1, 6) that may require re–inforcement under the gradient criteria and also needs to know the actual function that represents the channel to be constructed.

The leaders requested the engineering firm to construct a meeting area ($m^2$) for the subsequent meetings which they agreed to.

The meeting area constructed by the firm was bounded by the curve

Super-PlatinumSubmaths Collections - 0757573064

$y = x^2 - 6x + 5$ and a straight road $y = 0$

This area has been designed in away such that each person occupies an area of $\frac{1}{3}m^2$.

The next meeting is to be attended by 45 members, but the organizing secretary, is not sure whether all the members will be accommodated or not.

**TASK**

Basing on calculations with justification(s), help the engineering firm and organizing secretary resolve their concerns.

## SECTION B
## PART ONE

*Attempt only one item from this part*

**ITEM 3**

In a certain school, a group of old students want to start a project of constructing sanitation facility at their former school

They agreed to start with a contribution of Ugx 1,000,000 and increase it by a monthly contribution of 2,000,000 each month for a period of 14 months. They intend to raise Ugx 428,550,000 to fund the sanitation project.

In order to raise more funds, they have accepted other old students to join them once in a month and the number of new members (N) who join per month is modeled by $N = 5\left(2^{\left(\frac{t}{3}\right)}\right)$ where $t$ is time in month.

They need to have 80 new members only, but they don't know how long it will take to raise the required number of new members.

In order to ensure that the project can be accomplished in the shortest possible time, the old students must select an implementation committee of 5 members from 4 men and 7 women. This committee must have atleast 3 men for the project to be a success.

**TASK;**

Basing on mathematical calculations with justification(s) guide the team of old students with all the necessary details required.

**ITEM 4**

Musa and Mary own a commercial bakery in Kampala. They introduced a new yeast culture into a controlled fermentation chamber. The initial yeast mass measures exactly 40 grams.

Super Platinum Supmaths Collections - 0757373064

Under constant temperature, the yeast grows doubling its mass at the end of every hour of fermentation.
The fermentation chamber has a maximum capacity and if the yeast goes beyond 2,560 grams, it will overflow: they intend to stop the process and extract the yeast for baking during the exact hour the yeast mass reaches maximum, but they require guidance on when to do that.

In the packaging section of the Bakery, workers display a line of 12 distinct items consisting of 5 chocolates, 4 strawberries, and 3 vanilla cupcakes. The display shelf has 12 slots in a line.

The Head chief has advised that, in order to have clean view of the items, the 5 chocolate cupcakes must be placed next to one another. Musa and Mary are not sure of how many unique display layouts are possible.

The bakery's daily profit variance relative to fluctuating flour import costs is modelled by $3x^2 + (K+2)x + 27 = 0$; k represent a market tariff and $x$ is the cost index. For the business to have steady stable growth baseline costs, the equation must yield real and equal roots.

**TASK**

Using relevant calculations, with justification(s) help Musa and Mary to get the required details.

## PART II

***Attempt only one question in this section***

**ITEM 5**

The sports training team at a national training centre in Kampala wants to evaluate if a runner's total leg length can accurately predict their competitive stride length.

One of them, a sports scientist records the physical measurements of 10 long – distance runners in the tracking database as shown below.

| Leg length (x)cm | 85 | 92 | 80 | 95 | 88 | 90 | 84 | 98 | 91 | 87 |
|---|---|---|---|---|---|---|---|---|---|---|
| Stride length (y) cm | 160 | 175 | 150 | 182 | 166 | 170 | 158 | 190 | 172 | 164 |

The athletics federations offers a performance research grant of Ugx 5,000,000 to the department, provided the field data exhibits an exceptionally strong positive relationship between the variables in question.

Super Platinum Submaths Collections - 0757373064

While compiling the report, an 11th athlete arrived whose leg length measurement was missing from the sheet of paper. However, the data card was showing an exact stride length of 178cm. The research team needs to accurately estimate her leg length.

In the training centre, a certain fruit farmer who grows oranges and apples paid them a visit carrying a basket which had 10 oranges and 7 apples. The farmer offered some athlete an orange and an apple.

An athlete who was interested in two apples randomly selected two fruits out of the basket one at a time without replacement but had no idea on the chances that he had to get what he wanted.

The farmer harvested apples and he would like to sell them to a juice factory. The factory accepts apples that weigh atleast 100g and those ones that weigh less than 80g are automatically rejected. One day he harvested 3000 apples and he wanted to sell them. The weights of the apples at this farm are always normally distributed with mean weight of 95g and variance of 16g.
The head of the training team bought fruits from the farmer. In week one, he bought 500 oranges and 650 apples. In week two, he bought 462 apples and 300 oranges. In week three he bought 430 oranges. Each orange and apple is sold at ugx 350 and Ugx 500 respectively

**TASK**

Basing on calculations and justification(s)

a) Help the sports team to know whether they qualify for the grant and also estimate the required leg lengths as well as the number of apples that will automatically be rejected and those that will be accepted.

b) Guide the athlete with the chances he had to pick what he wanted and also the amount received by the farmer in the three weeks.

**ITEM 6**

In a certain school, the Academic committee held the meeting to decide on the promotional mark of students to candidate class.

It was resolved in the meeting that for a student to get a point in General Paper, he should have scored atleast 51%

The Director of Studies (DOS) presented the performance of learners in G.P as in the table below.

Super Platinum Sibmaths Collections 0757573064

| Marks | No. of students |
|---|---|
| 31 – 40 | 12 |
| 41 – 50 | 18 |
| 51 – 60 | 14 |
| 61 – 70 | 8 |
| 71 – 80 | 6 |
| 81 – 90 | 2 |

The chair person tasked the DOS to tell the committee the average performance of the learners and standard deviation of the learners' performance in GP.
He was also interested in knowing the likelihood of a learner being promoted if the pass mark keeps at 51%. The members agreed the if the likelihood exceed 0.5, the pass mark would be maintained otherwise it would be revised downwards.

The marks of the students are normally distributed.
The committee would like to establish the chances that a learner selected at random is awarded a G.P point.

In the same school, records of all enrolments and items bought to support the system are kept.
Mean while in the same meeting, the Deputy Headteacher in charge of academics, presented a table showing the enrolment of students since 2000 as in the table below

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|
| No. of learners | 540 | 300 | 380 | 640 | 540 | 500 |

One of the board members requested the Deputy headteacher to widen his analysis by computing a 3-point moving average for this data. He was also tasked to use the same data to estimate the enrolment for 2026.

After his presentation the procurement officer was also invited to present the food items purchased for the staff in the year 2004 and 2025. She summarized the information as shown in the table below.

Super Platinum Submaths Collections - 0757373064

| Commodity | Unit | Price in Ugx | | Quantity | |
|---|---|---|---|---|---|
| | | 2004 | 2005 | 2004 | 2005 |
| A (matooke) | Kg | 1800 | 1500 | 1500 | 2500 |
| B ( Bread) | Kg | 5000 | 7000 | 80 | 100 |
| C (Milk) | Litre | 2000 | 7000 | 60 | 60 |
| D ( Vegetables) | Kg | 1000 | 8000 | 45 | 60 |
| E( fruits) | Kg | 7000 | 6000 | 120 | 1000 |

The chairperson was not done yet with the procurement officer. He further asked her to use 2004 as the base year to present;

(i) Price index for each food item for 2005 as well as the aggregate price index and value index

**TASK**

Based on mathematical justification(s) Generate the information the DOS, Deputy Headteacher Academic and the procurement officer will give to the committee members.

**==END==**

Super Platinum Submaths Collections - 0757373064

*S475/1*
*Subsidiary Mathematics*
*Paper 1*
*July/August 2026*
$2\frac{1}{2}$ *hours*

# BUGANDA EXAMINATIONS COUNCIL MOCKS

**Uganda Advanced Certificate of Education**

**Subsidiary Mathematics**

**Paper 1**

**2 hours 30 minutes**

## Instructions to Candidates:

- *This paper consists of **two** sections; **A** and **B**. It has six examination items.*
- *Section **A** has **two** compulsory items.*
- *Section **B** has **two** parts; **I** and **II**. Answer **one** item from each part.*
- *Respond to **four** examination items in all.*
- *Any additional item(s) responded to will **not** be scored.*
- ***All** answers **must** be written in the answer sheets provided.*
- *Graph paper is provided.*
- *Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

Super Platinum Submaths Collections - 0757373064

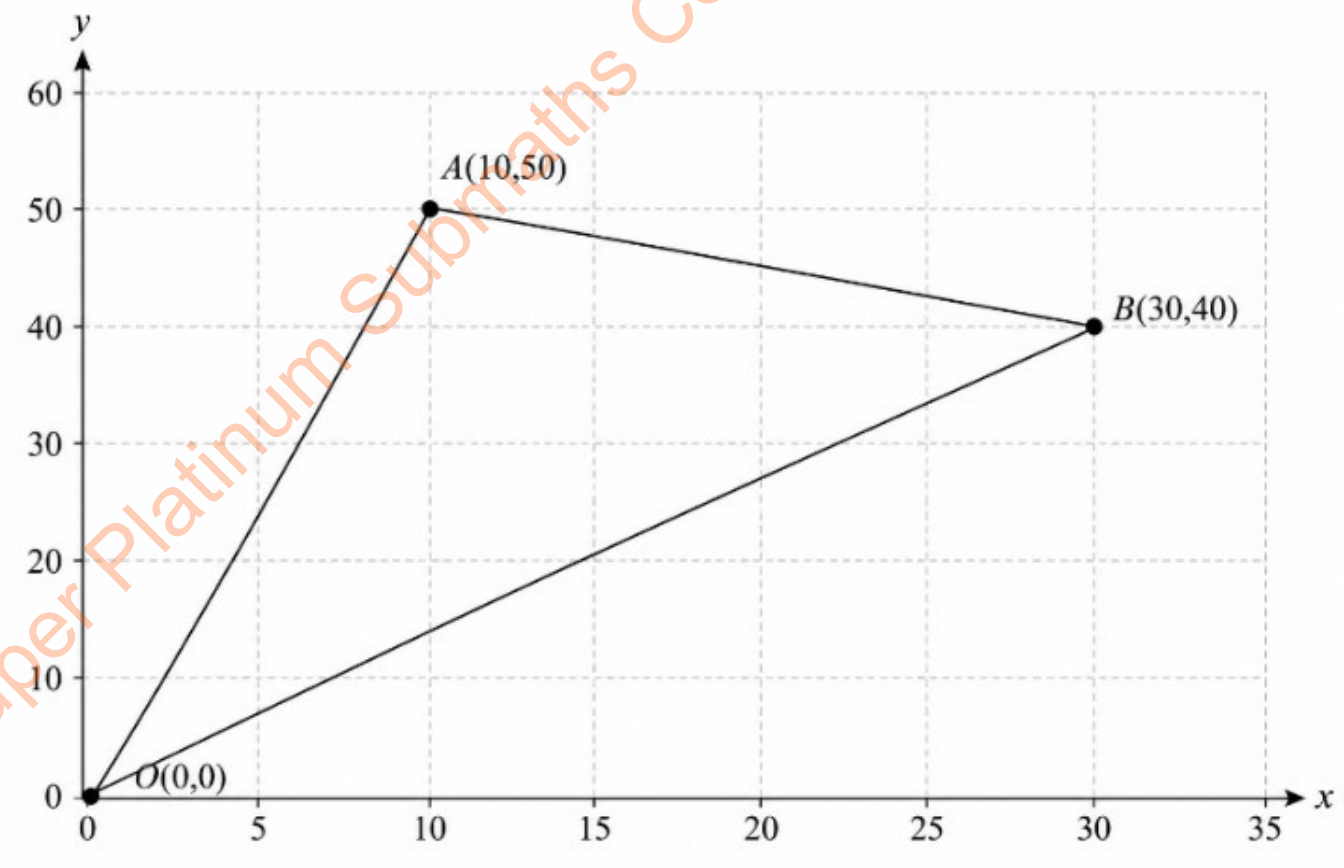
## SECTION A

*Respond to* **both** *items from this section*

### Item 1

A school has been facing a problem of electricity blackout especially during night times when students are doing their personal reading. They have approached a solar company to install a solar panel. The company has bought a new solar panel tracking device that is mounted at an angle $\theta$ to the ground. In order to maximize the energy efficiency, the panel's angle is adjusted basing on the day. This gives a daily power output measured in kilowatts which is modeled by the equation: $\mathbf{4} + \boldsymbol{tan^2\theta = sec\theta(7 - \sec\theta)}$,with a restricted angle range between$\mathbf{0^o}$and not exceeding$\mathbf{180^o}$. The engineer sent on ground has been told that if this angle less than $\mathbf{60^o}$, then he will need to get a partner to help him fix the solar panel. He now wants to find out if he needs to get a partner to go with him to the school site and he greatly needs your help.

Initially the panel was placed at point A located on a solar monitoring grid. However, wind made it to adjust its position and shift to point B thus reducing on the power output. The illustration shown on the monitoring grid is given in below with O being the ground level.




Super Platinum Submaths Collections - 0757373064

The engineer suggests to the company that if the angle AOB that the solar panel changed is above $30^o$then he advises that they should change the position of the solar panel completely.

**Task**

(a) Using mathematical justification, Help the engineer find out if he needs to get a partner to go with at the school site to fix the solar panel.

(b) Using mathematical justification, guide the company to decide if they should change the position of the solar panel.

**Item 2**

According to the census in 2025, the town of Nyimbwa has a population of 5,000 people. Due to a new agricultural initiative and economic development, the population is growing at a rate proportional to the current population. It was projected that the estimated population after 5 years will be7, 500 people. The district officials plan to construct a new secondary school in Nyimbwa town if the population of the people after 12 years reaches at least 13,000. They are not sure if they should go ahead with the plan.

The district planners are to use a new remote-controlled drone moving in a straight line to measure the distance between the site of the new school to the main road. The displacement s(t) of the drone in meters from the starting point at any time t in seconds is given by the formula $s(t) = 2t^3 - 9t^2 + 12t - 5$.To use this drone, the drone should move down wards at the moment when the acceleration of the drone is zero. He needs your help to find out if he should use this drone.

**Task**

(a) Using mathematical justification, advise the district officials whether they should go ahead and construct a school in the Nyimbwa Town.

(b) Using mathematical knowledge, help the pilot decide if he should use this drone.

Super Platinum Subm aths Collections - 0757373064

## SECTION B
## Part I

*Answer only* **one item** *from this part.*

### Item 3

The agriculture students have been facing a problem of pests in their newly planted garden. They have decided to launch a water balloon to scare way crop pests, and the height of the balloon in metres over time **t** in seconds is modeled by the expression $-5t^2 + 20t + 15$. This model will be taken if the water balloon reaches the maximum height in less than 3 seconds. The students need your help to decide if they should go ahead with this model.

They have decided to dig a borehole that can be used for irrigation during drought. However due to the complexity of the task, the school administration has offered to dig it for them. The teacher has been tasked to look for a drilling company. The survey shows that water is available at a depth of $25m$ drilled underground. The company charges $shs\ 15,000$ for drilling the first metre, and this increases by $shs 10,000$ per metre for each succeeding metres. The school administration has allocated $shs\ 3,000,000$ to cater for the borehole drilling and the students have been informed that if the allocated amount is not enough, the 75 students will have to top up the rest and each will pay the same amount. They now need your assistance to find out if its enough and if not how much each student will pay.

**Task**

(a) Using mathematical justification, help the students decide if they should go ahead with the model to help in scaring away the pests.

(b) By mathematical calculation, do you think the allocated amount is enough? Justify your answer.

### Item 4

In response to the Ebola outbreak, the ministry of health wants to dispatch a team of 7 professionals (consisting of both men and women) who have been fully trained to handle the outbreak, from 7 men and 6 women. The chairperson recommended option 1 where the committee should have more men than women while the field officer recommended option 2 where the committee should have more women than men. The option which gives more ways will be selected.

The disease broke out in a small village. The doctors modeled the number of possible patients ($x$) that can contract the disease in a day from one person is given by the equation $5^{2x} - 4 \times (5^{x+1}) - 125 = 0$. The doctors suggest a lock down if the number of patients exceeds 5. You have been approached by the team leaders to help the team make a recommendation.

**Task**

(a) Using mathematical justification, decide the best option to select.

(b) Advise by mathematical calculation if it is necessary to have a lock down or not.

Super Platinum Submaths Collections - 0757378064

## Part II

*Answer only* **one item** *from this part.*

### Item 5

A machine is producing materials for school uniforms whose Lengths are normally distributed with a mean of length of $\boldsymbol{6.5m}$ and a standard deviation of$\boldsymbol{0.025m}$. this year a school has received 400 new students who all deserve uniforms and the tailor has recommended that the measurements should fit in the range of $\boldsymbol{6.44m}$ and $\boldsymbol{6.55m}$. The tailor must be able make at least 300 uniforms for this order to be accepted. He needs your assistance to decide.

To make a complete uniform, the tailor buys four other items from Mama D's shop whose price relatives in 2025 with 2024 as the base year with their quantities (weights) given as follows; 15 pieces of Item A has a price relative of 115, 25 pieces of Item B has a price relative of 123, 10 pieces of Item C has a price relative of 154, 30 pieces of Item D has a price relative of 108. The tailor suggests that if the percentage increase in the index of retail prices based on the figures is above 20%, he will have to change the shop where to do the purchases this term.

S.1 has 90 new students and their weights were measured and grouped as follows.

| Weight(kg) | $35-39$ | $40-44$ | $45-49$ | $50-54$ | $55-59$ | $60-64$ | $65-69$ |
|---|---|---|---|---|---|---|---|
| Number of children | 8 | 15 | 25 | 18 | 12 | 7 | 5 |
| | 8 | 23 | 48 | 66 | 78 | 85 | 90 |

The tailor suggests that if the dispersion is greater than 5kg, then he has to make more uniforms of children above 50kg.

### Task

(a) Using mathematical justification, help the tailor decide if this order must be taken.

(b) Using mathematical justification advise the tailor if he should buy the items from Mama D's shop.

(c) By mathematical calculations, guide the tailor if she should make more uniforms of children above 50kg.

Super Platinum Submaths Collections - 0757373064

## Item 6

During the prefectorial screening by 10 staff members who make up the electoral commission of the school, two candidates appeared before the panel one after the other. Their scores based on articulation of roles of a head prefect from the panel were awarded and given in the table below.

| Panel Member | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| Candidate 1 | 78 | 70 | 90 | 78 | 71 | 81 | 86 | 79 | 83 | 74 |
| Candidate 2 | 80 | 70 | 90 | 78 | 72 | 85 | 85 | 77 | 81 | 73 |

The deputy head teacher joined the panel late and awarded a score of 89 points to candidate 2 but he was sure he can use that score together with the scores of the other members to estimate the scores for Candidate 1. The relationship between the scores would greatly guide the panel. if the scores were significant at 5% level of significance, the 1st runner-up (second) in elections would be appointed the Academics Prefect otherwise he will be dropped.

The new chairperson of the electoral commission wants to design ballot papers. The records from the previous chairperson show that red ballot papers for the lower secondary (S.1-S.2), Blue ballots for upper secondary (S.3-S.4) and green ballots for Advanced level (S.5-S.6). In 2023, he designed 200 red, 300 blue and 180 green ballots at total cost of shs 239,000. In 2024 designed 240 red, 320 blue and 200 green ballots at shs 268,000. In 2025 he designed 250 red, 350 blue and 220 green ballots at shs 288,000. The new chairperson has been provided with shs 350,000 to design 300 Red, 400 Blue and 250 Green ballots this year, but he is not sure if this money is enough.

### Task

(a) By mathematical calculation, guide the head teacher how he can estimate the score of Candidates 1 and how will you advise the panel on the 1st runner up.

(b) Find out by calculation if the money allocated to the chairperson is enough.

**END**

Super Platinum Submaths Collections - 0757373064

**S475/1**
**SUBSIDIARY**
**MATHEMATICS**
**Paper 1**
**2026**
$2\frac{1}{2}$ hours

**UGANDA NATIONAL EXAMINATIONS BOARD**

**Uganda Advanced Certificate of Education**

SUBSIDIARY MATHEMATICS

**Paper 1**

2 hours 30 minutes

## INSTRUCTIONS TO CANDIDATES

*This examination paper consists of two sections;* **A** *and* **B**. *It has* **six** *examination items.*

*Section* **A** *consists of* **two compulsory** *items.*

*Section* **B** *has two parts,* **I** *and* **II** *each with two optional items. Respond to only* **two** *items from Section* **B**, *choosing* **one** *item from* **each** *of the parts,* **I** *and* **II**.

*Respond to* **four** *items in all.*

*Any additional item(s) responded to will* **not** *be scored.*

*Begin each item on a fresh page.*

**All** *necessary working* **must** *be shown clearly.*

*Graph paper is provided.*

*Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

SAMPLE PAPER
Super Platinum Submaths Collections - 0757373064

© 2026 Uganda National Examinations Board 

## SECTION A

*All items in this section are* **compulsory**.

### Item 1

During preparations for a large campaign rally, the public address management team must position high power public address speakers in such a way that the candidates' speech can be clearly heard across the crowd.

The rally ground is represented on a coordinate plane such that the stage is at $S(0,0)$.

Two speakers have already been installed at **A** $(90,30)$ and **B** $(-70,60)$. A third speaker has been provided to be mounted only if the angle between sound projections **SA** and **SB** is more than $90^{o}$.

For quality sound from the speaker, the microphone used by the candidate should be fixed on a stand and projected at an acute angle determined by the mathematical relationship;

$2Sin^{2}\theta + Cos\,\theta = 1$, from the horizontal.

The public address management team needs guidance on whether the third speaker is needed and the angle at which the microphone should be projected.

**Task**:

Basing on calculations, with (a) justification(s), provide the guidance needed by the public address management team.

### Item 2

A certain community in Uganda relies on a nearby forest for firewood. Over the years, there has been an increase in the demand of firewood which has caused a decrease in the number of trees in the forest.

Environmentalists have modeled the number of trees T in the forest over time as;

$T(x) = 200000 - 1500x^{2}$, where $x$ is the time in years for the forest to get depleted.

The community leadership is concerned that if this decrease continues at the same rate, the forest will get depleted and therefore plans to have a sensitization meeting with the community members.

During the meeting, the community leadership needs to make a detailed analysis of the model including representing it graphically with a clear interpretation of the turning point and intercepts, so that community members understand how big the forest initially was and when it will be depleted.

Recently another forest in a neighbouring community caught fire and by the time fire fighters started putting out the fire, 100 hectares had burnt. It took 5 hours for the fire fighters to stop the fire completely.

SAMPLE PAPER
Super Platinum Sbmaths Collections 0757373064

The fire fighters observed that the rate at which the fire spread was proportional to the area of the forest burnt and that the proportionality constant was **0.1** hectares per hour. However, the fire fighters need to estimate the area of the forest remained after their intervention.

**Task:**

(a) Make the detailed analysis needed by the community leadership during the meeting.

(b) Address the need of the fire fighters.

## SECTION B

*Respond to only* **two** *items from this section, choosing* **one** *item from each of the parts* **I** *and* **II**.

### PART I.

**Item 3**

A bakery in a certain town is expanding its bread production to meet the increasing demand and has been given a contract to produce and supply 690 trays of bread to a supermarket within 10 days.

To fulfil the contract, the bakery has started by producing 6 trays of bread on the first day, will produce 9 trays on the second day, 12 trays on the third day and the bread production will keep increasing by the same constant number of trays each subsequent day.

The bakery manager wants to determine how long it will take to fulfil the contract if production continues to increase in the same pattern.

The bakery produces 6 different types of bread. A nearby shop wants to order for 3 different types of bread, however, the shopkeeper does not know the different possible number of selections to choose from if the order in which the types are chosen does not matter.

**Task**:

(a) (i) Assess whether the production pattern will enable the manager to fulfil the contract.

(ii) Recommend an alternative production pattern for the manager to fulfil the contract, assuming that 6 trays are produced on the first day.

(b) Determine the number of possible bread type selections， the shopkeeper can choose from.

SAMPLE PAPER
Super Platinum Submaths Collections - 0757373064

**Item 4**

Members of a football club had a meeting in January and agreed to give back to the community through a charity program.

Starting from February, each member was tasked to make an initial saving of Sh1000 and ensure that for each subsequent month, every member saves twice the amount he saved the previous month, up to November.

In the meeting, there was a well-wisher who promised to give them a contribution of half of each member's total saving if they raised their initial saving to Sh 5000 per member and instead use the mathematical relationship;

$A_n = 5000 \times 3^n$ to generate each member's total savings so that the charity program would take place in a month following their last month of saving.

However, members do not know the month they can have their charity program if they are to use the well-wisher's mathematical relationship to save.

During the meeting, the executive committee which consists of 8 members, five of which are female, was tasked to formulate an organizing committee for the charity program from among themselves. The organizing committee should consist of 6 members with **at most** 2 males.

The executive committee needs help to establish the month when the charity program will take place the well-wisher's suggestion and also determine the number of ways of selecting the organizing committee.

**Hint:**

In the relationship $A_n = 5000 \times 3^n$,

$A_n$ represents each member's total savings following the well-wisher's suggestion and it is half of the total saving each member would have made using the method they had agreed upon.

$n$ is the number of months they would take to save the amount $A_n$.

**Task**:

Determine the;

(i) Month when the charity program will take place.

(ii) number of ways of selecting the organizing committee.

SAMPLE PAPER
Super Platinum Submaths Collections - 0757973064

## PART II.

**Item 5**

The health department of a certain municipality operates a morning out patients' clinic that provides malaria testing and treatment to residents from the nearby community. Patients arrive at different times from 8:00AM to 10:00 AM.

After 8:00 a.m., health workers record the arrival time, T, measured in hours, for a randomly selected patient.
The municipal statistician modeled the arrival time of patients in the distribution below.

$$f(t) = \begin{cases} K(2t - t^2), & 0 \leq t \leq 2 \\ 0, & otherwise \end{cases}$$

Clinic records also show that the total number of patients arriving between 8:00 a.m. and 10:00 a.m. varies from day to day. The number of arriving patients, X, can be modeled by a normal distribution whose mean is 60 and variance 100.

The clinic currently prepares 65 malaria testing kits each morning and a shortage occurs when the number of patients exceeds the available kits.

The municipal health officer wants to establish how often shortages might occur over several days. The officer models the number of shortage days in a week of 5 working days as a Binomial distribution. It is a requirement to avail more kits should the likelihood of having a shortage for at least two days exceed 45%.

**Task:**

(a) Evaluate the likelihood of a randomly selected patient arriving between 9:00 a.m. and 10:00 a.m.
(b) Determine the probability that the number of patients arriving on a given day exceeds the 65 available testing kits.
(c) Assess whether the officer should prepare more kits.

**Item 6**

A school is preparing eight students to represent it at a regional mathematics competition. During a performance review meeting, the performance in two tests of the eight students was displayed as follows:

| Student | Test P(%) | Test Q(%) |
|---|---|---|
| A | 70 | 68 |
| B | 60 | 58 |
| C | 65 | 65 |
| D | 45 | 50 |
| E | 55 | 50 |
| F | 50 | 48 |
| G | 63 | 62 |
| H | 52 | 54 |



SAMPLE PAPER
Super Platinum Subnath Collections 0757373064

Their teacher, Ms.Winslet, needs to use the data to inform the school about the;

i) Test in which students' performance was more consistent.
ii) Relationship in performance in the two tests.
iii) Likelihood that a randomly selected student from the group scored above 52 in test Q and hence the implication of this likelihood on the general performance of the students.

**Task:**

Generate the information Ms. Winslet shall give to the school.

SAMPLE PAPER
Super Platinum Submaths Collections - 0757373064



**END**

S475/1
SUBSIDIARY
MATHEMATICS
PAPER 1
JULY/AUG 2026
2¼ HOURS

# PROVINCIAL EXAMINATIONS AGENCY (PEA)
# COUHEIA MOCK EXAMINATIONS 2026
## Uganda Advanced Certificate Of Education
## SUBSIDIARY MATHEMATICS
## Paper 1
## TIME: 2¼ HOURS

**INSTRUCTIONS TO CANDIDATES:**

*This paper consists of* **Two** *sections;* **A** *and* **B.** *It has* **six** *examinations items.*

*Section* **A** *has* **two compulsory** *items.*

*Section* **B** *has* **two parts**. *Answer one item only from each part*

*Answer a total of* **four** *items.*

*Any additional item(s) answered will* **not** *be scored.*

**All** *answers* **must** *be written in the answer booklets/sheets provided.*

**All** *working* **must** *be shown clearly.*

*Begin each answer on a fresh sheet of paper.*

*Graph paper is provided.*

*Silent non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

Super Platinum Submaths Collections - 0757373064

CamScanner

## SECTION A

*(Answer all items in this section.)*

### ITEM 1

The Government of Uganda is extending electricity to several villages to improve access to social services and promote economic development. An electricity substation is located at point **A**, while two villages that require electricity are located at points **B** and **C**. Surveyors establish the positions of the villages relative to a fixed origin $O$ as follows:

$$\overrightarrow{OA} = 2\mathbf{i} + 3\mathbf{j}, \quad \overrightarrow{OB} = 10\mathbf{i} + 9\mathbf{j}, \quad \overrightarrow{OC} = 14\mathbf{i} + 5\mathbf{j},$$

where one unit represents **1 kilometre.**

The engineer planned to connect each village directly to the substation using transmission lines. To estimate the quantity of materials required, they need to determine the lengths of the transmission lines. It is required that the angle between two transmission lines from the station is less than $45^0$ so that they can be installed safely without unnecessary crossing and reduce unnecessary cable bending.

During the design of the transmission line from the substation to village **B**, the engineer modelled its inclination and obtains the equation $4\sin^2\theta - 3 = 0,$

where $\theta$ is the angle of inclination of the transmission line measured from the horizontal.

There is need to identify the value $\theta$ in the range $0° \leq \theta \leq 360°$. that is suitable for the transmission line from the substation to village **B.**

In the absence of the engineer, you have been requested to offer assistance.

**Task**

a. Provide the necessary guidance on this project.

### ITEM 2

A coffee processing factory purchases coffee beans from farmers, processes them, and prepares them for export. To improve productivity and profitability, the factory management monitors the quantity of processed coffee produced each day.

The quantity of processed coffee, $Q$ tonnes, produced $t$days after the beginning of a production cycle is modelled by

$$Q = x^3 - 9x^2 + 24x + 10, \quad 0 \leq x \leq 7$$

where $x$ is measured in days.

The management is interested in determining the rate at which production changes, the periods when production is highest or lowest.

At the beginning of the processing day ($t = 0$), there are **1,000 bags** of processed coffee in the warehouse. The processing machine operates continuously and produces coffee at a constant rate of **500 bags per hour.**



Super Platinum Submaths Collections - 0757373064

CamScanner

As the day progresses, more transport trucks arrive to collect coffee for delivery. Consequently, the rate at which coffee leaves the warehouse increases with time and is given by $D(t) = 300 + 50t$ bags per hour,

where $t$ is the time in hours after processing begins.

One customer requested to send track after 4 hours to pick 1350 bags of coffee. The warehouse manager wants to monitor the stock level to ensure there is enough coffee to meet customer demand.

Hint: At the warehouse, Net Change Rate of stock = Production Rate - Demand Rate

**Tasks**

Help the manager to

a.
   i. Determine the rate of change of coffee production with respect to time.
   ii. Determine the periods when production is highest or lowest.

b. monitor the stock level by the time the track arrives.

## SECTION B

### PART I (*Answer **one item only.***)

**ITEM 3**

The Traffic Police Department in a certain district has observed an increase in road accidents, especially during weekends. To improve road safety, traffic officers conducted a speed-monitoring exercise at a major highway checkpoint. During selected observation periods, they recorded the speeds of vehicles passing through the checkpoint and carried out alcohol tests on drivers.

After collecting the data, the Operations Officer issued the following directives:

i. Drivers whose vehicles do not exceed the average speed recorded during the survey may be pardoned and allowed to proceed without penalty.

ii. If statistical analysis shows that 90% of the vehicles are travelling at speeds greater than 67 km/h, additional traffic officers must be deployed on that highway section to strengthen enforcement and reduce accidents.

The recorded speeds (in km/h) of the 40 vehicles observed are shown below:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 24 | 55 | 63 | 34 | 36 | 56 | 40 | 28 | 43 | 66 |
| 55 | 58 | 72 | 48 | 49 | 50 | 51 | 61 | 52 | 53 |
| 53 | 54 | 45 | 41 | 56 | 39 | 57 | 57 | 46 | 58 |
| 59 | 60 | 51 | 62 | 31 | 64 | 65 | 44 | 68 | 47 |

Super Platinum Submaths Collections - 0757373064

CamScanner

In addition, the permit inspection revealed that 60% of the drivers were male. Of the male drivers, 85% possessed valid permits. Of the female drivers, 90% possessed valid permits. All drivers with invalid permits must pay a fine.

The officers also discovered that the probability that a driver tested at the checkpoint is found driving under the influence of alcohol is 0.6. On a certain day, sample of 8 drivers undergone alcohol test.

More alcohol test machines will be provided if the expected number of drunk drivers is more than 4 and that the probability that more than 6 drivers are found drunk exceeds 0.15.

**Task**

a. Help the Operations officer to know
   i. below what speed should vehicles be pardoned.
   ii. if there is need for more traffic officers.
b. Find the number of drivers who were fined for invalid permits.
c. Advise the Traffic Police on whether more resources should be allocated to alcohol-testing operations at the checkpoint.

**ITEM 4**

Following a health directive from the Ministry, the Head teacher of a boarding secondary school plans to purchase sanitation supplies for the Girls' and Boys' sections from wholesale shops to minimize costs and improve hygiene standards.

The Girls' Section requires 40 jerrycans of liquid soap, 25 long-handled brushes, and 15 packets of disinfectant. The Boys' Section requires 35 jerrycans of liquid soap, 30 long-handled brushes, and 10 packets of disinfectant.

The costs of the items are shown below:

| Item | Cost per Unit (Shs) |
|---|---|
| Liquid soap (jerrycan) | 20,000 |
| Long-handled brush | 8,000 |
| Disinfectant (packet) | 12,000 |

To monitor the effectiveness of sanitation measures, the school health committee recorded the number of sanitation-related illness cases reported in the boarding section over six consecutive months.

Super Platinum Submaths Collections - 0757373064



CamScanner

| Month | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|
| Number of Cases | 36 | 32 | 25 | 28 | 19 | 21 |

The committee also conducted a study on student absenteeism due to sanitation-related illnesses. From past records, the probability distribution for the number of students absent on any given day is shown below.

| Number of Students Absent ($x$) | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| P(X) | 0.20 | 0.30 | 0.25 | 0.15 | 0.10 |

The Head teacher needs a report that;

i) indicate the sanitation budget,

ii) analyses a 3-month trends in student health by and estimates cases in July,

iii) estimate the expected daily absenteeism caused by sanitation-related illnesses.

**Task**

As part of the healthy committee member, prepare the necessary requirements for the head teacher

## PART II (*Answer **one item only.***)

**ITEM 5**

A district hospital is organizing a Community Health Outreach Programme to increase awareness about malaria prevention, immunization, and maternal health services.

On Monday, a village health worker informed 3 households about the programme. Each of the households was requested to inform 3 other households the following day, and this process continued throughout the week. By Sunday, health officials expected that information about the programme would have reached a large number of families in the community.

Among the invited guests are 5 senior doctors and 7 district health officers from different districts.

During the programme:

- The 5 senior doctors are to be seated in a straight row during a panel discussion, with the Chief Medical Officer occupying the seat at the extreme left.
- The 7 district health officers are to be seated around a circular table to discuss strategies for reducing the spread of communicable diseases.

Later, a health advisory committee of 6 members is to be selected from the doctors and health officers to oversee the implementation of health recommendations. To ensure adequate medical expertise, the committee must include at least 2 doctors.

Super Platinum Submaths Collections - 0757373064



CamScanner

Meanwhile, the hospital has received donations of medical supplies that need to be packaged for distribution to remote health centres. A health worker has a rectangular piece of cardboard measuring 40 cm by 30 cm and intends to cut equal squares from each corner before folding the sides to form an open box. The hospital requires the box to have a base area of 936 $cm^2$, but the health worker is unsure of what size to cut.

**Task**

As a mathematics student assisting the hospital management:

a. Estimate the total number of households that are likely to have received information about the health outreach programme by Sunday.
b. Determine:
   i. The number of different seating arrangements for the senior doctors and district health officers.
   ii. The number of ways the health advisory committee can be selected.
c. Advise the health worker on the size of the squares that should be cut from the cardboard to produce the required box volume for packaging the medical supplies.

**ITEM 6**

A building company plans to construct a rectangular workers' storage yard. To monitor project expenses, the finance department developed a profit model given by

$$P(x) = x^2 - 16x + 60$$

where $x$ represents the number of work units completed. The management wishes to determine the units at which the company makes neither profit nor loss.

The company also keeps records of construction materials. While calculating material ratios for concrete mixtures, an engineer encountered the expression

$$\frac{1}{2-\sqrt{3}}$$

and needed to simplify it to know how many wheels of sand (a) bags of cement (b) and wheels of stones (c) to use in form $a + b\sqrt{c}$ .

To meet increasing demand for housing, the company plans to increase the number of houses completed each month. In the first month, 20 houses were completed. Thereafter, the company completed 5 more houses each month than in the previous month. The manager wishes to know how long it will take them to make 90 houses

**Tasks**

As a Mathematics student assisting the building company to:

a. determine the break even point.
b. obtain the concrete mixture ratios.
c. find the length of time needed to curb the demand for housing.

**END**

Super Platinum Subnaths Collections - 0757373064

CamScanner

S475/1
SUBSIDIARY
MATHEMATICS
PAPER 1
July/August 2026
$2^1/_2$ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

**Uganda Advanced Certificate of Education**

SUBSIDIARY MATHEMATICS

**PAPER 1**

**2 hours 30 minutes**

**INSTRUCTIONS TO CANDIDATES:**

- *This examination paper consists of two sections* **A** *and* **B.** *It has* **six** *items.*
- *Section* **A** *has* **two** *compulsory items.*
- *Section* **B** *has* **two** *parts; part* **I** *and part* **II,** *each with two items. Respond to* **only two** *items from section B choosing* **one** *from each part.*
- *Respond to* **four** *items in all.*
- *Any additional items responded to will* **not** *be scored.*
- *All responses must be written in the answer booklets/sheets provided.*
- *Graph paper is provided.*
- *Silent non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

© WAKISSHA Joint Mock Examinations 2026

**Turn Over**

Super Platinum Submaths Collections - 0757373064

CamScanner

## SECTION A

*All items in this section are* **compulsory.**

**Item I**

Mr. Senkeezi is one of your neighbours. He would like to fence off his small piece of land on the side where members of the community trespass. One pole is at a point A with position vector $\overrightarrow{OA} = 6\underset{\sim}{i} + 2\underset{\sim}{j}$. While the second pole is at point B with position vector $\overrightarrow{OB} = 2\underset{\sim}{i} + 8\underset{\sim}{j}$. He has decided to add another pole at point C with position vector $\overrightarrow{OC} = 4\underset{\sim}{i} + 5\underset{\sim}{j}$ in order to reinforce the wire mesh. Unfortunately his neighbour claims that the third pole is not in line with A and B. He needs evidence to justify his action, otherwise he would have to relocate pole C.

Additionally, he plans to start a garage in his plot of land and one of the requirements is to construct an inclined plane for vehicle inspection.

The local builder he contacted has advised that the angle of incline should satisfy the equation $3\text{Cos}2\theta - \sin\theta + 2 = 0$. Mr. Senkeezi is aware that the angle of incline should be $30^0$. He is not sure whether to go ahead and use the local builder, or find another alternative.

**Task**

Use numerical evidence to help Mr. Senkeezi make informed decisions on whether to;

(a) relocate pole C.

(b) use the local builder.

**Item 2**

A certain private school decided to buy a maize mill in order to cut food costs by milling their own grown maize. The output M (in tonnes) is modeled by;

$M = n^3 - 6n^2 + 9n + 2$, where n is the number of days the machine is operated per week. If the maximum output per week exceeds 5 tonnes, the school may consider selling part of the produce to the nearby community as another source of income.

The school started making monthly sales. It was noted that the sales(s) were directly proportional to twice the time(t) of production (in months). At the start of the business, one tonne of maize flour was sold. After 3 months, 5 tonnes were sold. If by the end of eight months less than 150 tonnes are sold, the school may consider widening the customer base beyond its immediate community.

**Task**

Basing of mathematical evidence help the school to make informed decisions.

## SECTION B

### PART I

*Respond to* **one** *item from this part.*

**Item 3**

Mr. Kaluma has to repay a loan of 3 million shillings. He has been given two repayment options:

**Option 1:**

He makes an initial deposit and keeps increasing the monthly installments by a constant amount such that;

In the $5^{th}$ month he would pay Ugx. 90.000

In the $12^{th}$ month he would pay Ugx. 160,000



© WAKISSHA Joint Mock Examinations 2026

Super Platinum Submaths Collections - 0757373064

CamScanner

**Option 2:**
The repayment plan is modeled by $7^x = 12$, where $x$ is the period of payment. His target is to repay the loan in the shortest time possible so that he obtains a top up loan. He is however unsure of which option (repayment) to choose.
Additionally, Kaluma recently mobilised five other farmers (3 men and 2 women) to form an investment club. The bank guided that they would need a committee of 3 comprising at least 1 woman. If the possible number of ways of choosing the committee exceeds 5, Kaluma will volunteer to be the chairman, so that only 2 other members are chosen.

**Task**
Use mathematical evidence to help Mr. Kaluma make informed decisions.

**Item 4**
A community learning centre in a growing town plans to improve the sports culture in the community by constructing a sports centre where both indoor and outdoor games can be explored.
To raise funds for the project, the centre management plans to organize a sports fundraising dinner at a cost of 5,500,000. Community members and well-wishers are expected to pay a participation fee to attend the event. The total funds expected to be collected from the event, depend on the number of participants and are modeled by:
$F(x) = 200x^2 + 12{,}000x + 50{,}000$
Where;
- $x$ is the number of participants attending the dinner.
- $F(x)$ is the total amount of money collected in (Uganda shillings).

The management has agreed that the fundraising dinner will only be considered successful, if the money collected is at least equal to the cost of organizing the event.
In addition, the management has launched a sports centre infrastructure fund to support the construction of a swimming pool.
The management contributes money to the fund every 18 months, in the 1st month, they contribute Ugx 1,200,000 and the monthly contributions increasing by Ugx 50,000 each subsequent month.
After 18 months, the accumulated money is to be invested in a bank that offers 10% compound interest per annum.
The management estimates that Ugx 40,000,000 will be required to complete the project. They have agreed that construction will only begin when the investment fund reaches or exceeds this amount.

**Task**
Use mathematical justifications to advise the management.

## PART II

*Respond to* **one** *item from this part.*

**Item 5**
A certain company that packages different types of drinks introduced a new product in a community. The company management wanted to know whether people liked the product. They carried out a survey by asking 30 random community members to rate the product on a scale of 1-5. The information was summarised in the table 1 below;

table 1

| Scale | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| No. of people | 2 | 8 | 13 | 6 | 2 |



© WAKISSHA Joint Mock Examinations 2025

Super Platinum Submaths Collections- 0757373064

CamScanner

If the variance is greater than 1, the sale of the new product would be halted.
The management further wants to compare the sales at the depot over the past 9 months shown in the table 2 below, on a quarterly basis.

table 2

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Sales(In millions) | 70 | 82 | 40 | 70 | 62 | 90 | 45 | 76 | 65 |

If the estimated sales in the 10th term are greater than 90 million shillings, the management will consider increasing the wages of their workers. Additionally the depot is officially supported to be opened four days a week. However, some residents have complained that its only opened twice a week. A quick survey reveal the following information in table 3 below.

table 3

| $x$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| P(X - $x$) | 0.15 | 0.35 | 0.41 | 0.08 |

Where;

- $x$ represents the number of times the depot is open.
- P(X = $x$) represents the respective probabilities. If the expected number of times the depot is open is less than 3, the depot supervisor would be changed.

Some residents also complained about a particular soft drink that would make them drowsy. The probability that the drink could make someone drowsy was 0.25. A sample of 20 residents was investigated. If the probability that at least 8 of them get drowsy is greater than 0.5, the drink would be removed from the shelves.

**Task**
Basing on numerical evidence, help the company management to make appropriate decisions.

**Item 6**
The National volley ball championships are scheduled for this term. According to the organisers the weight of the learners is normally distributed with an average of 50 kg and a variation of 1. The sports department in your school has 50 learners to choose from randomly, and would like to take at most 12 students of only learners whose weight exceed 49 kg, otherwise they will not participate. They need your help on the feedback to give the organisers.
Additionally a group of 10 learners would like to move with the team as cheer leaders. The sports department has requested for the details of their ages and mass, which are shown in table 4 below;

table 4

| Age (yrs) | 12 | 13 | 11 | 12 | 14 | 13 | 14 | 13 | 12 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|
| Weight (kg) | 40 | 35 | 37 | 43 | 45 | 40 | 36 | 42 | 38 | 47 |

The department will consider taking the group, if the relationship between their age and weight is very strong.

In the past, the learners had complained about the poor feeding by organizers during the National games, rating them as follows on a scale of 1-5.
5 rated the food 1, 13 rated it 2, 14 rated it 3, 8 rated it 4 and 20 rated it 5.
The department would consider special meals for the learners during the championship if the variability exceeds 1.2.

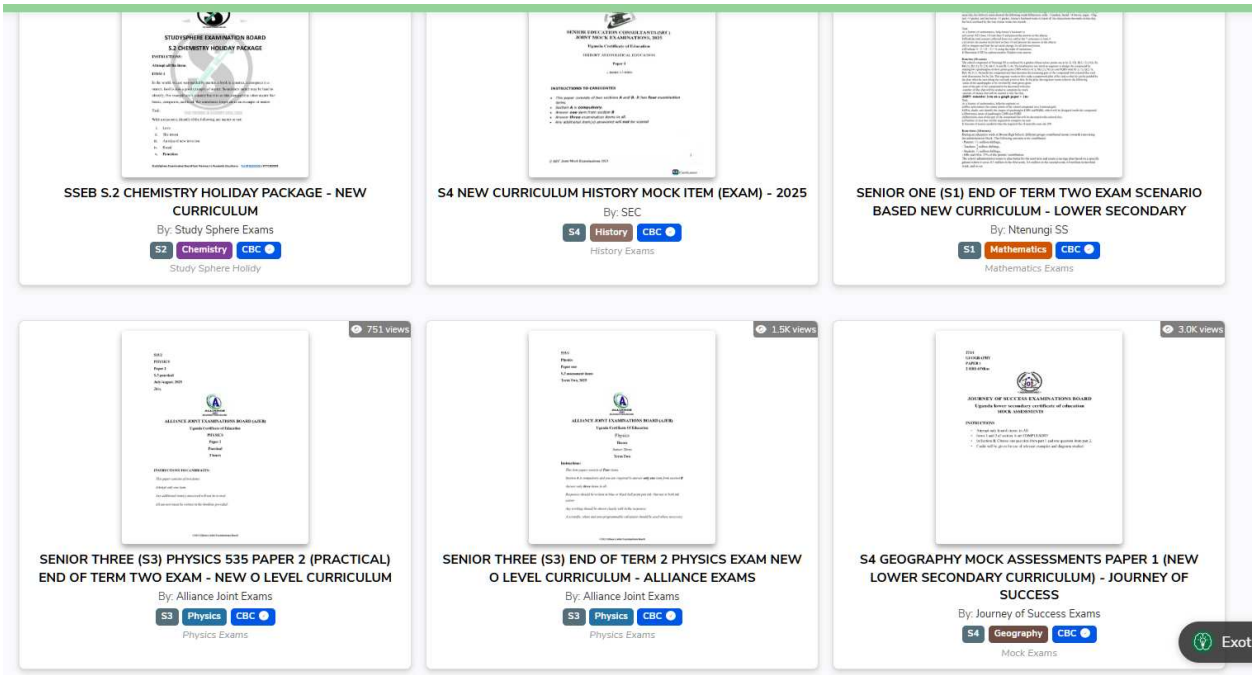
**Task**
Using numerical evidence, help the sports department to make informed decisions.

**END**

Super Platinum Submaths Collections - 0757373064

CamScanner

This document was downloaded from https://exoticnotes.com




**Do you need more papers for secondary?**

Click
https://exoticnotes.com/papers/secondary

## If you need papers for O level (S.1 – S.4)

Click
https://exoticnotes.com/papers/secondary/o-level

## If you need papers for A level (S.5 – S.6)

Click
https://exoticnotes.com/papers/secondary/a-level