

JINJA PROGRSSIVE SECONDARY SCHOOL

MATHEMATICS DEPARTMENT

SEMINAR ITEMS

FORMAT OF THE PAPER:

SECTION A: This will comprise of two items and they are compulsory.

SECTION B: This comprises of part 1 and part II each having two questions and a learner answers one question from each part.

ITEM	AREA OF CONSTRUCT	TOPIC/CHARPTER COVERED
SECTION A: COMPULSARY		
Item one	Numbers	➤ Number bases
		➤ Working with integers
		➤ Fractions, percentages and decimals.
		➤ Numerical concept 1 and 2
		➤ Ratios and proportions
Item two	Patterns and algebra	➤ Sequences and patterns
		➤ Equations of lines and curves
		➤ Algebra 1 and 2
		➤ Mapping and relations
		➤ Inequalities and regions
		➤ Equation of a

		straight line
		➤ Rectangular Cartesian plane
		➤ Simultaneous equations
		➤ Linear programming
		Loci
SECTION B		
PART 1 (Choose one question)		
Item 3 and 4	Data and probability	➤ Data collection and presentation
		➤ Graphs
		➤ Set theory
		➤ Data collection and display
		➤ Matrices
		➤ Probability
PART II (choose one question)		
Item 5 and 6	Geometry and Measures	Geometric construction
		➤ Bearings
		➤ General and angle properties of geometric figures
		➤ Reflection
		➤ Bussiness arithmetic
		➤ Time and timetables
		➤ Similarities and enlargement
		➤ Circle

		➤ Rotation
		➤ Length and area properties of two dimensional geometric figures
		➤ Nets, areas and volumes of solids
		➤ Trigonometry 1 and 2
		➤ Vectors
		➤ Business mathematics
		➤ Matrix transformation
		➤ Circle properties
		➤ Lines and planes in three dimensions

SMARTMATHUG DIGITAL NOTES

REVIEWED by: Our Academic Team | ©2026 SmartMathUG

VISIT: Smartmathug.com



This document is downloaded from smartmathug.com

GET MORE NOTES AND PAST PAPERS FROM

Smartmathug.com

THANK YOU FOR LEARNING WITH @SMARTMATHUG

Download the app from Google Play Store for interactive tutorials, past papers, and teacher assistance!

Item 1

The image part with relationship ID r161 was not found in the file.

You decided to have a joint graduation party with your family members which will cost a total of four million Ugandan shillings. You are nearing a D- day and you want to find out whether you have enough required amount of money or not. And below are the contributions.

- Your parents promised to contribute 30% of the money.
- Your friends promised 10% more than that your parents promised.
- And since you are the owner of the party, you contributed 20% of the required amount.

When you went for shopping, you moved 6km due East from your home and the 8km due South to reach the market directly to save time. And you made a booking of one million, seventy five thousand for all items required for the party.

Task

- a) How far is it from your home to the market if you used the shortest route as the old man told you?
- b) Make a simple budget for the party according to the booking.
- c) Do you have the required amount for the party? Justify.
- d) How much would you remain with according to the budget?
- e) What advice can you give the party organizing committee?

Item 2

The youths of Mawoitto village have been playing football on Mr. Kibwika's land. Of recent, Mr. Kibwika has decided to cultivate his land to plant cassava and the youths are no longer having where to play football from. On reporting to the chairperson and the aspiring member of parliament(M.P) of their area,the chairperson promised them land that measures 60m by 120m, while the aspiring M.P promised a tractor that would be used to level this land into a football pitch. The youths are therefore to contribute for the fuel that would be used to run the tractor.

- The dimensions of the pitch should be 100m by 50m.
- *Scale* : 1cm represents 10m.
- The cost of fuel is Ugx.5,000 per liter.
- The tractor uses 10 liters every after 30 minutes.

Task:

- a) Help the youth leader of the village to;
 - i. Design the given piece of land.
 - ii. Determine the area of the proportion of land that remains after the construction of the football pitch.
 - iii. Decide on what the remaining land should be used for.
- b) If the tractor levels 100m^2 in one hour, how much money should be raised by the youths to level the ground.

Item 3

The image part with relationship ID r161 was not found in the file.

A senior four student staying in a hostel of a certain secondary school in Namutumba, wished to collect water from the nearby borehole and empty it in a cylindrical tank of diameter 1.8m and height 1.2m located within the compound of their hostel. The student used a plastic bucket which was in the shape of a frustrum having an open end of diameter 30cm and a bottom diameter of 20cm and height of 42cm.

A painter was sent by the headteacher of the same school to paint the walls of this hostel. He mixed three kinds of paints A, B and C to form a homogeneous paint of capacity three hundred and sixty liters. The ratio by amount used of paint A to paint B was 3:2 and that of paint B to paint C was 1:2. Paint A costed Ugshs. 1,800 per liter, paint B costed Ugx. 2,400 per liter and paint C costs Ugx. 1,275 per liter.

Task:

- a) Determine the;
 - (i) Capacity of the plastic bucket of water in liters correct to 3 decimal places.
 - (ii) Capacity of the cylindrical tank correct to 2 dp.
 - (iii) Number of buckets that must be drawn to fill the tank.
- b)
 - (i) Amount of each paint in the mixture.
 - (ii) Amount of money needed to make 1 liter of the mixture.
 - (iii) Percentage profit made by selling the mixture at Ughs 2,210 per liter.

Item 4

A chicken farmer in Mayuge decided to weigh a sample of 800 eggs on his farm and classify them according to their mass (in grams) in order to optimize the packing process. The frequency distribution of the egg masses is as follows:

Mass in grams	Number of eggs
40 – 44	36
45 – 49	142
50 – 54	286
55 – 59	238
60 – 64	76
65 – 69	22

The farmer's plan is to pack eggs in given weights.

Task:

- a) Determine the median mass of an egg from the frequency distribution to understand the central tendency of the egg weights.
- b) What would be the percentage of eggs which would be classified as large (over 62 grams).
- c) The farmer plans to pack eggs that weigh over 62 grams, with each pack containing 12 eggs. If each pack costs UGX 12,000, calculate the total revenue the farmer will earn

from selling all the large eggs and compare the revenue earned from selling the same eggs to a middle man who is buying at UGX 9,000. What advice will you offer to this farmer?

Item 5

A young enterprenuer from a remote area in northern Uganda is planning to start up a small bakery business and seeks your advice on financial matters related to her venture. She plans to invest a total of \$10,000 into the business and wants to understand the financial implications of different financing options. She has approached two money lenders and she is asking for your input before she takes on the decision.

Lender 1: This young enterprenuer , wants to borrow UGX 50,000 from a local bank to purchase the baking equipment. The bank offers her two different repayment plans:

- **Option 1:** *Simple Interest* – The loan is offered at an annual interest rate of 20% and to be paid after 2 years.
- **Option 2:** *Compound Interest* – The loan is offered at an annual interest rate of 4% and is to be paid after 2 years.

Lender 2: This young interprenuer is considering a hire purchase agreement with a bakery equipment supplier. The total cost of the equipment is \$1,000 followed by monthly payment of \$400 for 24 months. The supplier will consider a constant dollar rate of \$1 = UGX 3,800.

Task:

- a) Calculate the total repayment amount for each financial option over the loan term and compare them to determine which option would be more cost- effective for the young enterprenuer's bakery business.
- b) Analyze the monthly cash flow implication for this young enterprenuer, under each financing option, considering her ability to manage operational expenses alongside loan repayments.
- c) Based on your calculations and analysis in (a) and (b), provide the young enterprenuer , with a recommendation on which financial option would be optimal for her bakery business, taking into account both total repayment amount and monthly cash flow considerations.

Item 6

In preparation for S.4 prom party that took place at Elite International School last term, one of the students was chosen by his fellow candidates to be the chairperson organizing committee. This student had to travel from their school which was located within Entebbe Municipality to Kyaliwajjala for shopping of party items which was 160km north of their school. From Kyaliwajjala, he moved west wards 150km to Kajjansi town. From there, he headed to Ndeeba town which was 90km in the S75°W direction. From Ndeeba, he continued to Kyebando town which was 148km south of Kajjansi town. Later on he discovered that there was a shortest route he could have used to move directly from their school to Kyebando town.

In Kyebando town, he did the shopping and bought 400 chicken at UGX 35,000 per chicken.

The seller offered him a 2% discount on each chicken plus an additional 5% discount for any number of chicken bought in excess of 250. He also bought two identical jerrycans of cooking oil. The larger being of height 30cm and the smaller of 25cm. The larger has a capacity of 10liters and the smaller 5liters. If he bought 4 smaller and 2 larger jerrycans.

Task:

- With relevant sketch and calculations, determine how far the student would move if he used the shortest route.
- Determine the total cost incurred in purchasing chicken.
- What is the maximum amount of cooking oil the student bought for the prom party?

Item7

In Jinja District, a father has a rectangular piece of land and decided to give a triangular piece of land ABC with a mvule tree planted at each of the corners. $AB = 80\text{m}$, $BC = 100\text{m}$ and angle $ABC = 60^\circ$. He decided to construct a circular wall touching all the three straight edges for his residence and leave the other areas for growing vegetables. The last time he tried to determine this circular boundary, it was not touching one straight edge. This farther Identifies you as a student of mathematics and has given you a plane paper, pencil, ruler and a pair of compasses to kindly help him to;

locate the distance of centre of the circular wall from the trees at A and B respectively.
subsequently, find the size of the area for growing vegetables.

Task:

Using a suitable scale, help the family determine the:

- centre of the circular wall.
- radius of the circular wall.
- area for growing vegetables in square meters.

Item 8

Your member of parliament with an intension of giving out loans for small Paris development model, visited a SACCO of 30 people. He interviewed them on the following activities; Agriculture (A), Fishing (F) and cattle keeping (C).

It was agreed that;

Each person engaged in agriculture gets shs. 400,000

Each person engaged in fishing gets shs. 500,000

Each person engaged in cattle keeping gets shs. 300,000

Each person engaged in none of the activities and one engaged in more than one activity doesn't qualify to get this money.

The MP found out that one member engaged in all the three activities, three were engaged in agriculture and fishing, five were engaged in fishing and cattle keeping, four were engaged in agriculture and cattle keeping and two did not engage in any of the three activities. Equal numbers of people were engaged in each of the three activities.

Task:

Basing on calculations, advise the community officer on the number of members who;

(I) qualify to get the money

(II) do not qualify to get the money

(b) How much money does the MP need to give this SACCO?

Item 9

During a football training, the coach positions three cones at different points to form a triangular portion ABC. The points were marked correctly using coordinates A(1, -3), B(3, -4), and C(1, -5). Due to many players in the team, there is a change in the position of the cones to create space for the second lineup during the training session. The coach makes sure the points undergo a rotational transformation to form the new position A'B'C'. The coordinates for the new position are (3, 1), (4, 3), and (5, 1) respectively.

Task:

- (a) As a senior four student, help the coach to locate the original position of the cones and the new position of the cones on the same coordinate axes and find the angle between them. Use a scale of 1cm to represent 1 unit on both the horizontal and vertical axes.
- (b) The cones are further changed from A'B'C' through a rotation of positive quarter turn about the origin to form new positions A''B'' and C'' for the last players of the team to train. Determine the coordinates of the new position A''B''C'' and the angle between ABC and A''B''C''
- (c) The school experiences a problem of scarcity of training materials, and plans to get a loan of UGX. 3,000,000 for buying the training materials. The loan is to be paid back in 3 years. One bank offers the loan at a simple interest rate of 10% and the other offers the same loan at a compound interest rate of 5%. The school is finding it hard to decide which bank to get the loan from. Help to advise the school which bank they should get the loan from and why?

Item 10

Hamis a trader in Kampala sold 800 tiles in the first month. Each tile costs UGX. 4000. In the second month, he sold 16% more tiles than in the first month. In the third month, he sold 22% more than in the first month. Each month, the trader receives commission of 7% on the price of each tiles for the first 500 tiles sold. He also receives 11% commission on each tiles sold in excess of 500 tiles.

From the commission that Hamis got as his reward, he started a small business at school(canteen). His sales from the canteen for three days were as follows; on Monday, the canteen sold 32 soda, 12 mineral water bottles, 33 queen cakes and 52 samosas. On Tuesday, 27 sodas, 14 mineral water bottles, 28 queen cakes and 45 samosas were sold. On Wednesday, 25 sodas, 29 queen cakes, 16 mineral water bottles and 36 samosas were sold. The canteen sells each soda at UGX. 1000, each mineral water bottle at UGX.700, each queen cake at UGX.500 and UGX.400 each samosa.

Task:

- (a) Find how many more tiles were sold in the third month than in the second month and calculate the commission he received in the third month.
- ii In a certain month, the trader received a commission of UGX. 265,400. Calculate the number of tiles he sold in that month.
- (b) Help Hamis to organize the information from his side business of the canteen and find the amount of money gained from the sales of the items per day.

Item 11

Sarah and Rakib have been looking for a job to find a way of living in the city. Fortunately they were called to work in one of the factories in Jinja where they agreed to receive a total of UGX.306,000 for the work done. Rakib is paid for 14 days while Sarah is paid for 15 days of work. Rakib's pay for 6 days is UGX.6000 more than what Sarah gets for 4 days.

From what they always earn, Sarah and Rakib plan to spend some money for consumption in the restaurant to buy tilapia fish. A restaurant offers two kinds of fried tilapia; full and half. It costs UGX.3000 and UGX.5000 to have half and full tilapias ready for consumption, respectively. The quantity of half plus two times that of full tilapias does not exceed 20. At the same time, the quantity of full tilapia does not exceed twice that of half tilapia. The restaurant makes a profit of UGX.1000 and UGX.1,500 on half and full tilapias each, respectively.

Task:

- (a) As one of the financial manager at the factory, help Sarah and Rakib to know how much each earns per day?
- (b) Find the quantity of each kind of fried tilapia that should be made so as to obtain maximum profits, if the restaurant is ready to invest UGX.60,000.

Item 12

The image part with relationship ID r161 was not found in the file.

The teacher of physical education Mr. Rogers marked three different points during the practical lesson. He named the points OPQ to form a triangular shape. He labelled displacement OP as vector $\mathbf{p}$, and displacement OQ as vector $\mathbf{q}$. He further marked point T on OQ such that $4\text{ OT}=\text{OQ}$ and also marked point R on PQ such that the ratio of PR: RQ = 2:5. He stationed point X as the point of intersection such that lines OR and PT meet at X so that $\text{PX}=\mathbf{n}\text{ PT}$ and $\text{RX}=\mathbf{m}\text{ RO}$, where $\mathbf{m}$ and $\mathbf{n}$ are constants. He also organized a raised table in form of a cliff 23m high above the ground and told one of the students Auma who is 1m high to stand on top and observe the movement of the ball that is going to be kicked by Joshua. Joshua kicked the ball and Auma observed it approaching her directly from Joshua. At first the angle of depression is 12 and later 41.

Task:

- express the following vectors in terms of $\mathbf{p}$ and $\mathbf{q}$
 - OR
 - PT
 - TR
- Express RX in two different ways in terms of $\mathbf{p}$, $\mathbf{q}$, $\mathbf{m}$ and $\mathbf{n}$. Hence find the values of $\mathbf{m}$ and $\mathbf{n}$
- How far did the ball advance between the first and second observation?

Item 13

Mr. Kyewalyanga is working with the newly set up institute in Bugweri district and his annual gross salary is UGX.9,180,000 which includes the following allowances:

Family relief and insurance: UGX. 384, 000 per annum

Marriage allowance: $1/18^{\text{th}}$ of the gross monthly income

Housing allowance: UGX.60,000 per month.

Water and electricity: UGX.36,000 per month.

Medical: UGX.330,000 per annum.

Transport allowance: UGX.34,500.

Family allowance for four children only

Age(years)	Amount (UGX.)
0 to 10	22,000
Between 10 to 17 inclusive	18,400
Over 17	12,500

Mr. Kyewalyanga has a family of five children, two of whom are aged between 0 and 10 years, one aged 19 years, another 12 years and the other 17 years.

The income tax structure on taxable income is shown in the table below;

Taxable income (UGX.) per month	Tax rate (%)
1-45,000	Free
45,001-115,000	18.0
115,001-210,000	24.5
210,001-330,000	36.0
330,001-480,000	41.4
Above 480,000	48.0

- (a) Mr. Kyewalyanga wants to find out how much of his money is taxed but he could not determine it. As a senior four student, help him to;
- Calculate his taxable income.
 - Calculate his income tax
- (b) Determine the percentage of his gross monthly salary that goes to tax.
- (c) Mr. Kyewalanga plans to use part of his net pay to travel abroad. Given that 1US Dollar (\$) = UGX.3728. Help him to convert his net pay to dollars

Item 14

A certain peasant man deep in Buyende district wished to construct a simple one roomed house. He was advised to employ a professional civil engineer to help him construct this permanent structure using burnt bricks. The engineer erected the four walls of 8m long, 6m wide and 3m high upto the wall plate. From the wall plate level, he joined pieces of timber and iron sheets to form a roof that was constructed in the shape of a pyramid. All the slanting edges of the roof where 10m long. The engineer decided to label the four base corners of the pyramid shaped roof as A, B, C and D, and its vertex as V.

But due to the financial stand of this peasant, he decided to only paint the inner surfaces of the four walls with a budget of UGX 400,000. The room had two painted doors in the middle of the walls opposite to each other. Each door was 2m high and 0.75m wide. The room also had one painted window in one of the side walls which was 1 square meter. A painter charged UGX 800 per square meter painted, and for every 10 square meter wall painted consumed a 4 liter tin paint, which was sold at UGX 70,000.

Task:

As a mathematics student;

- Help the civil engineer design an appropriate roof for the house of the peasant. What will be the;
 - Height of the roof from the wall plate level.
 - Angle formed between each slanting edge and the base ABCD.
 - Angle formed between the planes VBC and VAD.
 - Volume of the house.

b) Establish computations to find out if the budgeted money could be enough for painting work.

c) If a painter offers a discount of 10% on labour and 5% on every liter of paint , how much money shall the family save?

Item 15

The geography department of Jinja Progressive Secondary School is planning to transport its senior four students for a fieldwork in Kasenyi in Entebbe municipality on Mon 8th. July.2024. Each trip of the bus costs shs 40,000 and that of a coaster costs shs 25,000. The bus has a capacity of 42 students and that of a coaster is 14 students. All the 126 registered students contributed a total of shs 200,000 and will go for the tour. The coaster is expected to make more trips than the bus.

While in Kasenyi, their geography teacher Mr. Sempa visited the nearby shopping mall which happen to be the largest called Victoria shopping mall. While inside it, he found out that three shirts and two trousers costed shs.105,000. Also two shirts and five trousers costed shs.180,000 .

Task;

- a)
 - (i) As a mathematics student, help the geography department to formulate five inequalities from the information given above.
 - (ii) Determine the number of trips each vehicle should make so as to spend the least amount of money.
- b) Find the cost;
 - (i) Each shirt and each trouser.
 - (ii) Three items of each type at the shopping mall?

END

"Great Thanks Goes To The JIPRA Mathematics Team"