PILKINGTON COLLEGE MUGULUKA
END OF TERM I 2025 EXAMINATIONS

S.5 PURE MATHEMATICS
PAPER 1

1 HOUR

INSTRUCTIONS TO CANDIDATES:

· Attempt all three items.

· Responses to each item on a fresh sheet of paper.

· Untidy work may lead to a loss of scores.

ITEM 1
Your teacher presents a challenging problem of determining the vertical height of the flagpole and the horizontal distance between two students, Mia and Sam, who are looking up at the top of the school flagpole. Mia is 1.5 meters tall and stands 10 meters from the base of the flagpole, measuring an angle of elevation of 35° to the top with a clinometer. Sam stands 15 meters away, measuring an angle of elevation of 25°; however, his height is unknown, although he is taller than Mia. They are on the same side of the flagpole, in a straight line from its base, indicating that Sam is 5 meters farther from the pole than Mia. For safety reasons, the school plans to install a safety net under the flagpole to catch the flag if it falls during the daily flag-raising ceremony, ensuring student safety while maintaining a clean yard. The cost of the net is UGX 50,000 for each meter of the flagpole's height. Both students are on flat ground.

Task: Help the teacher calculate the cost of the safety net and determine Sam's height.

ITEM 2
It was Sports Day at your school, where students cheered from the sidelines as athletes ran on the field. Three students, Amara, Ben, and Chloe, members of the entrepreneurial club, set up a snack stall near the sidelines to sell to the cheering crowd. Amara made chapatis, Ben made samosas, and Chloe made mandazis. They competed to see who could sell the most and earn the highest sales. However, the busy day created a challenge when they attempted to record only the total sales in their notebooks, instead of the price of each item. Their first sale was to the cheering squad: six chapatis, ten samosas, and three mandazis for UGX 10,500. At midday, the second sale was to the teachers: two chapatis, eight samosas, and seven mandazis for UGX 7,900. Later, the third sale of the day was to the football team: five chapatis, four samosas, and four mandazis for UGX 8,200. When Sports Day ended, Amara, Ben, and Chloe sat with their notebooks. They wanted to find out the prices of one chapati, one samosa, and one mandazi to see who won the competition and plan for the stock for the next day.

Task: Who won the competition based on sales amount?

ITEM 3

Onyumel runs a maize flour business near Jinja Market. To minimize stock costs, he cultivates maize on a farm close to the Source of the Nile. His initial rectangular plot measures 120 square meters, which is sufficient for his needs, featuring a length that is 5 meters longer than the width, allowing for orderly rows. Each square meter produces 2 kg of maize per season. Seeds are priced at UGX 5,000 per kilogram, with 1 kilogram covering an area of 10 square meters. Fencing costs UGX 1,500 per meter, and he has allocated a budget of UGX 90,000 to keep animals at bay. As demand increases, he plans to expand the land area to 150 m^2, maintaining a length of 5 meters and a width greater than 5 meters. He considers the implications if fencing prices rise to UGX 2,000 per meter.

Task:

(a) How many kilograms of maize are planted in the expanded plot?

(b) What is the difference in the cost of fencing the expanded plot and the first plot?

END