

DEPARTMENT OF MATHEMATICS
UGANDA ADVANCED CERTIFICATE OF EDUCATION
MID TERM II EXAMINATIONS 2026
S.5 PRINCIPAL MATHEMATICS 2
TIME: 2 HOURS 30 MINUTES

INSTRUCTIONS TO THE CANDIDATES

- Attempt all items
- Untidy work shall lead to loss of marks

Item 1

The factory in Nakawa Uganda that produces plastic containers offers transport means to its customers whereby they only charge the fuel fee. The fuel fee only depends on the distance of the warehouse of the customer from the factory. Past records show that for distances of 2 km, 10 km, 15 km and 21 km from the factory, customers were charged Ugx.15,250, Ugx.76,200, Ugx.114,400 and Ugx.160,150 respectively for fueling the vehicle.

Mugisha a customer at the factory is not sure if Ugx.92,500 is enough to deliver containers to his warehouse that is 13.4km from the factory according to the past records.

Musa's warehouse is located 25.5km from the factory and his transport budget does not exceed Ugx. 194460. He wishes to have his fuel transported to his warehouse by the company basing on the same operating systems.

Task:

Use mathematical analysis to help the factory determine whether they should review their operation systems.

Item 2

UPDF is a national military force in Uganda responsible for recruiting people interested in joining Army. On 4th June, 2026, they called for applications from those interested in being recruited in Army.

While receiving these applications, some applicants submitted their applications online and others physically to Joan the secretary at the UPDF head office. Due to applicants submitting at different times, it became hectic for Joan to keep putting these applications in a file one at a time. Joshua her friend advised the secretary to record the time intervals in minutes for the next 6 applicants and be filing these applications every after the semi-interquartile range of these times. The secretary agreed to take on the advice if and only if it could not make her wait for more than 30 minutes before filing an application. The time intervals were recorded as 80,20,60,20,10 and 30 minutes.

The advert specified that an applicant should include his/her height in centimeters. The data below shows the number of people who applied with their heights.

Height (cm)	Number of applicants
160-	18
170-	37
175-	60
180-	65
185-	48
190-195	22

The director of defense, wishes to know the dominant height and if it is below 180 cm, there should be a need to re-advertise.

He also wants to know, the tallest 40% of the applicants so that they will be given a special training.

Task:

- (a) Did Joan follow Joshua's advice?
- (b) Help the director of defense to know;
 - (i) Whether there should be a need to re-advertise
 - (ii) The number of applicants who will be given a special training.

Item 3

A business lady in Kampala city with a small clothes shop, decided to observe the number of customers, X who enter her shop every after an hour. She realized that the customers follow a probability distribution as shown below.

Number of customers, x	0	1	2	3	4
Probability $P(X = x)$	0.15	0.34	0.27	0.14	0.1

She aims at putting a discount on the clothes if the expected number of customers entering her shop every after an hour is less than 3.

The business lady deals in only two types of clothes, dresses (D) and skirts (T). The probability that a customer picks a dress is $\frac{2}{3}$. Due to limited number of customers, some clothes are worn-out (W). 3% and 6% of the dresses and skirts respectively are worn-out. She plans to bring a new stock if the probability of a customer picking a dress given that it is worn-out is above or equal to 0.5.

Task:

As a child to the business lady, guide her to make constructive decisions.

ITEM 4

A football player projects a ball at a speed of 8m/s at an angle of 30° with the ground. The ball strikes the ground at a point which is level with the point of projection. After impact with the ground, the ball bounces and the horizontal component of the velocity of the ball remains the same but the vertical component is reversed in the direction and halved in the magnitude. The player running after the ball kicks it again at a point to which is at a horizontal distance of 1.0m from the point where it bounced in the same direction. He wants to know the horizontal distance between the point of projection and the point to which the ball first strikes the ground and also the time interval between the ball striking the ground and the player kicking it again. He wants to know the height of the ball above the ground when it is kicked again.

Hint use $g = 9.8 \text{ m/s}^2$

Task:

Help to solve the above challenges

END