SENIOR FOUR MATHEMATICS

Scenario-Based Examination Paper 5

Time: 2 Hours 30 Minutes

Instructions

Answer all items in Section A

Answer ONE item from Part I and ONE item from Part II in Section B

Answer FOUR items in total

Use silent non-programmable calculators where necessary

Show all working clearly

Section A (Compulsory)

Item 1

A local bakery sells three types of bread: white, whole grain, and rye. In a week, the bakery sold 480 loaves of bread. The number of white bread loaves sold was twice the number of whole grain loaves. The number of rye bread loaves was 80 less than the number of whole grain loaves.

The bakery makes a profit of 800 shillings on each white loaf, 1200 shillings on each whole grain loaf, and 1500 shillings on each rye loaf.

Task

A. Calculate the number of loaves sold for each type of bread.

B. Find the total profit made by the bakery for the week.

C. If the bakery wants to increase the total profit by 20%, how many additional white loaves should they sell assuming the number of other loaves remains the same?

Item 2

A water tank is in the shape of a cuboid with a length of 3 meters, width of 2 meters, and height of 1.5 meters. Water flows into the tank at a rate of 200 liters per minute.

Task

A. Calculate the capacity of the tank in liters.

B. Determine the time taken to fill the tank completely.

C. If water is drained out at 120 liters per minute while the tank is being filled, how long will it take to fill the tank?

Section B

Part I (Answer ONE item from this part)

Item 3

A school carried out a survey on students' preferred sports. Out of 150 students surveyed, 70 like football, 65 like basketball, and 45 like volleyball. Twenty students like both football and basketball, 15 like both basketball and volleyball, and 10 like both football and volleyball. Five students like all three sports, while 30 students do not like any of the three sports.

A student is selected at random.

Task

A. Determine the number of students who like only football.

B. Calculate the probability that the student likes basketball or volleyball.
C. Find the probability that a student likes basketball given that they like volleyball.

Item 4

The following table shows the marks scored by 40 students in a Mathematics test:

Marks Range	Number of Students
0 – 9	2
10 – 19	5
20 – 29	8
30 – 39	12
40 – 49	9
50 – 59	4

Task

A. Calculate the median mark for the test.
B. Determine the modal class and explain what it shows about the students' performance.
C. Estimate the percentage of students who scored below 30.

Part II (Answer ONE item from this part)

Item 5

A farmer owns a triangular plot of land with vertices A, B, and C. The lengths of sides AB and AC are 100 meters and 80 meters respectively, and the angle BAC is 60 degrees. The farmer plans to divide the plot into two smaller plots by constructing a fence from vertex A to a point D on BC such that AD is perpendicular to BC.

Task

A. Calculate the length of side BC.
B. Find the area of the triangular plot ABC.
C. Determine the length of the fence AD dividing the plot.
D. Calculate the areas of the two smaller triangular plots ABD and ADC.

Item 6

A point P has coordinates (3, 2). The point is first reflected about the y-axis to form P'. Then, P' is translated by the vector (-4, 5) to form P".

Task

A. Find the coordinates of point P'.
B. Find the coordinates of point P".
C. Describe the single transformation that maps point P directly to point P".
D. Sketch the points P, P', and P'' on a coordinate plane.

END OF PAPER 5