QOMHSK

S.5 END OF TERM ASSESSMNET 2025

PRINCPAL MATHEMATICS:

TIME: 2 HOURS AND 45 MINUTES

INSTRUCTIONS:

- Attempt ALL items in section A and any 2 items in section B
- Start each on a fresh page

SECTION A

ITEM 1

During a treasure hunt in one of the Egyptian pyramids, the participants have gone through the first two levels that required physical touch, and on the next challenge find two puzzles that need to be solved to provide digits that show with tiles of the puzzle need to be step on to get to the treasure hunt safe, they as follow:

Treasure hunters	8 **A**	-2 **B**	-1 **C**	-0.5 **D**	$\frac{\sqrt{5}}{4}$
$+\sqrt{2}$ **E**	$+\sqrt{5}$ F	7 **G**	0 **H**	4 **J**	-4 K
6 **Z**	$-\sqrt{3}$ **W**	$-\sqrt{5}$ **X**	5 **P**	12 **Q**	***SAFE***

Puzzle A: $\log_x 5 + 2\log_5 x = 5$ **Puzzle B**: $\sqrt{x+5} + \sqrt{20-x} = \sqrt{21+7x}$

Task:

a) Using your knowledge of algebra, solve the puzzles hence help describe a path that should be taken up by the treasure hunters to reach the safe by the stating the letter on each tile they should step on.
b) The safe requires two pairs of keys of coordinates that can be got from solving the clues $2x + 3y = 5$ *and* $xy = 1$. Find the two pair of keys that should be used.

ITEM 2

Uganda Tourism Ministry has been studying the growth in numbers of tourists coming into the country. Based on past recorded, they modelled number of tourists per year as an exponential growth model given by the formula; $T = T_0 4^{rt}$. *Where r is the growth rate, and t is the number of years.*

They discovered that in 2010, the number of the tourist who entered the country where approximately 550,000 and the annual growth rate was estimated to be 5%. They tourism industry was to receive a government funding if by 2020 the number of expected tourists was more than one million.

Task:

a) Using the growth model, did the government give the tourism industry funding to boost the sector.
b) If by 2020 the number of lions in the country's game reserves where close to 650 only and have been dropping at an annual rate of 12%; modelled as $N = N_0(1 - r)^t$ *with r* as the rate *and t* as the time taken in years. Determine how long it would take to the nearest year for the number to drop to almost 300 lions. In which year will it be.

ITEM 3

In a clinical trial for a new drug to be used on market three patients dubbed: $\boldsymbol{M, N}$ *and* $\boldsymbol{Q}$. the head of research and development has tested the same drug on the patients but exposing them to three conditions, however it seem a one of the patients had lied on the medical exams about certain genetic condition that has put the results collected into jeopardy.

Under condition as follows the following equations were modelled;

Neutral condition: $2M + 3N + 4Q = -4$

Moderate -altered: $4M + 2N + 3Q = -11$

Extremely altered: $3M + 4N + 2Q = -3$

The patient how supposed lied test **positive** for a rare genetic condition that affects the results collected and needs to identifies and his/her sample removed from other.

Task:

a) As part of the research and development team of the pharmaceutical company, help identify the patient whose request should not be dis regarded.
b) Originally the data from the trial showed a straight line with equation $5y + x = 7$, with the changes to considered when a new patient replaces the positive one, a new line passing through point of basis $H(2, 4)$ and perpendicular to the previous one. Find the new line equation and confirm the result from the rial is a success if and only if the intercept of this new line is negative.

SECTION B

ITEM 4:

A group of forty-five women did go to Health centre V for antenatal care during the month of August 2024. Their ages were collected as started below;

17	17	17	19	19	19	20	22	22	22	23	23	24	25	25
25	26	26	26	26	27	27	28	28	28	29	29	29	30	32
32	32	34	34	35	35	35	35	36	37	38	38	44	45	48

The nurses in charge of the care to the pregnant mothers we tasked to find the median ages and as well fine the 75% age of these mothers. For it was to be forward to the **District healthy commission** to make certain decision on providing better family planning options incase the 75% was greater than 38 years or build a bigger expecting mother's ward incase the median age was less or below 28

Task:

a) Construct a grouped frequency table for the women's ages, using intervals $17-20, 21-24, 25-28, \ldots$.
b) Draw a statistical diagram that you will use as a basis for the district health commissioner to make a decision on what of the two options they should consider

ITEM 5

At a poultry farm that deals in meat production for a chicken, the monthly weight records from the sale of the month of April 2025 chicken. The farmer manager has to order for a change to new feed supplier if the **average** weight of the month is below 720 grams.

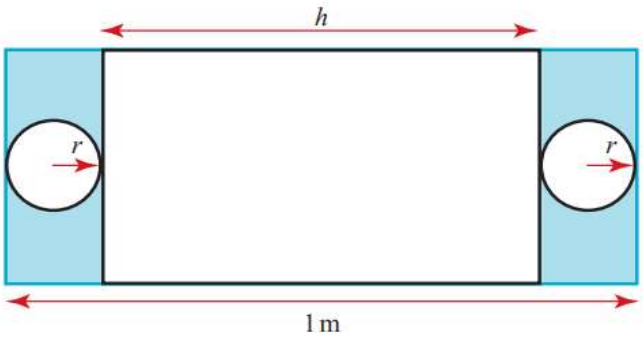
The data is as shown below:

Weight(grams)	700	710	720	730	740	760	770	790	810
Number of chickens sold	4	19	53	77	23	75	53	30	18

Task:
Using your statistical knowledge will the, manager change to a new feed supplier? What the standard deviation of the weights of chicken from the data above.

ITEM 6

The diagram shows the net of a cylindrical container of radius r cm and height $h$cm. The full width of the metal sheet from which the container is made is 1 m, and the shaded area is waste. The surface area of the container is 1400π cm^2.



Task:

i. Write down a pair of simultaneous equations for r and h.
ii. What are the two possible volumes the container formed can be collect. (Leave your answers with π in it)

END