S2: INTEGRATION ACTIVITIES ACROSS ALL 13 TOPICS.

Tr. Kabuzi maths.

NOTE: In some chapters or topics, a single Activity Of Integration (AOI) may be insufficient to cover all the learning outcomes. Therefore, it is necessary to provide more than one AOI to comprehensively address all the desired learning outcomes.

ACTIVITY OF INTEGRATION TOPIC 15

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Mappings and relations.

THEME: Patterns and Algebra.

@africastruggle

SCENARIO.

In a library, multiple students (x) borrow multiple books (y). Each student can borrow several books, and each book can be borrowed by multiple students. The mapping is f: $Students \rightarrow Books$.

SUPPORT.

$f(Alice) = \{Book\ 1, Book\ 2\}$

$f(Bob) = \{Book\ 2, Book\ 3\}$

$f(Charlie) = \{Book\ 1, Book\ 3\}$

The librarian has lost track of which students borrowed which books. Using the given mapping, help the librarian identify:

TASK:

Can you help the librarian solve this problem?

ACTIVITY OF INTEGRATION TOPIC 16

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Vectors and Translation.

THEME: Patterns and Algebra.

@africastruggle

SCENARIO.

A factory robot navigates a 2D grid using translation vectors. Its initial position is A. The robot makes two movements:

Movement 1: $T_1 = (5, -2)$

Movement 2: $T_2 = (-3, 4)$

The robot's final position is (4, 5).

The robot operator needs to determine the initial position of the robot before any movements, and the intermediate positions after each move.

TASK:

Help the operator figure out the robot's path.

ACTIVITY OF INTEGRATION TOPIC 17

NAME: **.....**

STREAM: **.....**

TIME: 30 minutes**.**

TOPIC: Graphs.

THEME: Data and Probability**.**

@africastruggle

SCENARIO.

Towns P and Q are 200 km apart. At 7:00 AM, a taxi left Town P for Town Q at a speed of 50 km/h. After 2 hours, it experienced a mechanical problem and stopped for 1 and a half hours. After the delay, the taxi resumed its journey at a speed of 80 km/h towards Town Q. Thirty minutes after the taxi's departure, a lorry left Town Q for Town P, traveling nonstop at a speed of 40 km/h. The taxi driver wants to graphically determine the point and time where he will meet the lorry on the way.

TASK:

Help the taxi driver graphically locate the point and time where he will meet the lorry driver on the way.

ACTIVITY OF INTEGRATION TOPIC 18

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Numerical concept 1.

THEME: Numbers.

@africastruggle

SCENARIO.

A construction company has been assigned the task of building a wall. The time (T) required to complete the project decreases exponentially as the number of workers (n) increases. The relationship between the number of workers (n) and the time (T) in days is expressed as: $T = 1024 \times 2^{-n}$. The company's CEO is struggling to express the calculated days for 2, 5, 12, and 16 workers in standard form and has requested your assistance in providing these values in the correct format.

TASK:

Help the CEO determine and express the time required (in days) for workers in standard form.

ACTIVITY OF INTEGRATION TOPIC 19

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Inequalities and Regions.

THEME: Patterns and Algebra.

@africastruggle

SCENARIO.

The manager of a small bakery is struggling to represent the bakery's production constraints on a graph. The bakery produces two types of bread: loaves and buns. Each loaf costs $2 to produce, and each bun costs $1. The bakery has a daily budget of $100 that cannot be exceeded. In addition, the bakery must produce at least 20 loaves every day to meet customer demand.
The manager wants to visualize these conditions on a graph but has no idea how to represent the constraints as inequalities to sketch them on the graph to show the region satisfying all the conditions.

TASK:

Help the manager visualize the bakery's production conditions on a graph.

ACTIVITY OF INTEGRATION TOPIC 20

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Algebra 2.

THEME: Patterns and Algebra.

@africastruggle

SCENARIO.

Your friend plans to construct a small rectangular flower garden with an area of $(2x-1)m^2$. He wants the sides of the farm to be $(x+3)m$ by $(x-3)m$, but he is struggling to determine the area of the garden and the length of the fence required to enclose the garden to avoid them being spoilt.

TASK:

Help your friend calculate area of the garden and the length of the fence needed to enclose the farm.

ACTIVITY OF INTEGRATION TOPIC 21

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Similarities and Enlargement.

THEME: Geometry and Measures.

@africastruggle

SCENARIO.

In a classroom art project, students are creating star patterns on a coordinate grid. One star starts as a square with vertices at $(1,1)$, $(1,2)$, $(2,1)$, $(2,2)$. To add symmetry to the design, the teacher asks the students to enlarge the square using a scale factor of -2 with the centre of enlargement at $(0,0)$.

TASK:

Help the students find the new coordinates of the square after the transformation and explain how the negative scale factor affects the size and position of the square.

ACTIVITY OF INTEGRATION TOPIC 22

NAME: **.....**

STREAM: **.....**

TIME: 30 minutes**.**

TOPIC: Circles.

THEME: Geometry and Measures**.**

@africastruggle

SCENARIO.

In your village, the community plans to construct a circular playing space for children with a radius of 350 meters. To make it comfortable for the kids and their guardians, they want to place a seat around the edge of the circular space at intervals of 5 meters. Each seat will cost 55,000 shillings. The community needs help figuring out how many seats will be needed and the total cost for the seating.

TASK:

Help the community determine how many seats are required and the total cost of the seats.

ACTIVITY OF INTEGRATION TOPIC 23

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Rotation.

THEME: Geometry and Measures.

@africastruggle

SCENARIO.

In your village, a student is working on a project to design patterns using geometric shapes on a coordinate grid. The student starts with a rectangle at the points $(1,1), (1,4), (4,1), (4,4)$. The student then rotates the rectangle to a new position at the points $(1,-1), (1,-4), (-2,-1), (-2,-4)$. The student is unsure of the centre and angle by which the rectangle has been rotated and needs help figuring out the angle of rotation.

TASK:

Help the student find the centre and angle of rotation (in degrees) used to rotate the rectangle from its original position to its new position.

ACTIVITY OF INTEGRATION TOPIC 24

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Length and Area properties of 2D Geometrical figs.

THEME: Geometry and Measures.

@africastruggle

SCENARIO.

The community council plans to build a rectangular playground with dimensions of $120\ meters$ by $80\ meters$. To enhance accessibility, they decide to include a $5\ meter - wide$ walking path surrounding the playground. The council needs to calculate both the area of the walking path and the total area covered by the playground and the path combined. Additionally, they want to know the total perimeter of the outer boundary for fencing purposes.

Task:

Help the council determine the total area of the walking path, the combined area, and the outer perimeter to calculate the material and fencing requirements.

ACTIVITY OF INTEGRATION TOPIC 25

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Nets, Areas and Volumes of solids..

THEME: Geometry and Measures.

@africastruggle

SCENARIO.

In your village, a farmer is planning to build a grain storage silo to prepare for the harvest season. The silo will consist of two parts: a cylindrical body with a radius of 40 meters and a height of 100 meters, topped with a hemispherical dome. The silo needs to be designed to maximize storage capacity while minimizing construction costs. The farmer wants to know how much material will be required to construct the silo, including the curved surface of the cylinder and the hemispherical dome, but excluding the flat base of the cylinder. Additionally, the farmer wants to determine the total volume of the silo to understand its storage capacity.

Task:

Help the farmer by calculating the total surface area of the silo to determine the material required and the total volume to estimate how much grain it can hold.

ACTIVITY OF INTEGRATION TOPIC 26

NAME: .....

STREAM: .....

TIME: 30 minutes.

TOPIC: Numerical concept 2.

THEME: Numbers.

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SCENARIO.

Your sibling's homework involves rationalizing a surd $\frac{3+2\sqrt{2}}{2-\sqrt{2}}$ and expressing the result in the form $a + b\sqrt{c}$. He has already attempted the solution and his results are $a = 5, b = 7 \; and \; c = 2$ but is unsure if the answers are correct. He wants your help to solve the problem step-by-step, verify his work, and confirm whether his solution matches the correct answer.

Task:

Help your sibling by solving the problem, to confirm the accuracy of his answers.

ACTIVITY OF INTEGRATION TOPIC 27

NAME: **.....**

STREAM: **.....**

TIME: 30 minutes**.**

TOPIC: Set theory.

THEME: Data and Probability**.**

@africastruggle

SCENARIO.

In a school cafeteria, the food committee is gathering information on students' food preferences to plan a special meal. There are 100 students, with 72 students who eat meat, 60 who eat chicken, and 58 who eat beans. It was found that the number of students who eat both meat and chicken only is twice the number of students who eat both chicken and beans only. Additionally, 8 students eat only beans, 5 students eat only chicken, and 15 students eat meat and beans only. Students who don't eat any of the three are equal to those who eat chicken only. The committee is deciding whether to serve a mixed platter with all three items or focus on just one dish. If the number of students who eat all three items is more than 30, they will serve the mixed platter. If fewer than 30 students eat all three items, they will focus on a single dish.

TASK:

Help and advise the food committee whether they should serve a mixed platter or focus on one dish for the special meal.

For inquiries or suggestions, please contact:

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Tr. Kabuzi Maths.

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