HOLIDAY MATHSCIENCE NETWORK (HOMNET)
DECEMBER 2022

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OBJECTIVES OF HOMNET

1. ***To promote individualized and group practice of mathematics and sciences amongst learners in Secondary schools during holidays.***
2. ***To promote co-operation and integration amongst learners from various backgrounds by creating opportunities for them to share their experiences in the learning of Mathematics and Sciences.***
3. ***To promote the development of positive attitude in mathematics and sciences amongst the learners in Secondary Schools through mentorship.***

MATHEMATICS WEEK 2 – FORM 3 (MF3/W2/DEC/2022)

INSTRUCTIONS

a) Answer ALL the questions for each day as stipulated.
b) All the answers/solutions MUST be written on separate answer sheets and NOT on this question paper
c) Show clearly all the steps of your working
d) Scan to PDF or take a clear photograph of each page of your work and send via WhatsApp to the number provided above.
e) All the work to be submitted daily at or before 9 p.m.

MONDAY, 05th DECEMBER, 2022

FORM ONE

A forex bureau in Kenya buys and sells foreign currencies as shown below.

	Buying (in Ksh)	Selling (in Ksh)
1 Chinese Yuan	17.50	17.65
1 South African Rand	7.40	7.60

Ji Zhang, a business lady arriving from Beijing, China converted 7, 000 Chinese Yuan into Kenya shillings. While in Kenya, she spent Ksh. 73, 100 and converted the balance to South African rands before leaving for Johannesburg, South Africa. Calculate the amount of money in South African rands that she received. (3 marks)

FORM TWO

The surface areas of two similar solid spheres are 55.44 m^2 and 6.16 m^2. If the volume of the bigger sphere is 38.808 cm^3, calculate the volume of the smaller sphere correct to four significant figures. (3 marks)

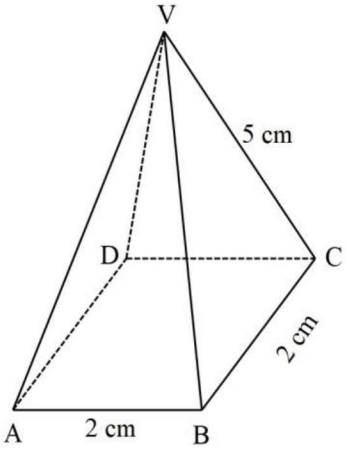
FORM THREE

The distance between two town A and B is 36 km. John and Paul are two cyclists. They both leave town A at the same time and cycle towards town B. John's speed is faster than Paul's by 4 km/hr, and John arrives in town B 1 hour 30 minutes earlier than Paul. Taking Paul's speed to be x km/hr, form an equation in x and solve for x. (4 marks)

TUESDAY, 06th December, 2022

FORM ONE

The figure below represents a right pyramid VABCD whose base is a square of side 2 cm. The slant edge of the pyramid is 5 cm.



Draw the net of the solid. (3 marks)

FORM TWO

Simplify the expression (3 marks)

$$\frac{3x^3 - 27xy^2}{x^3 + x^2y - 6xy^2}$$

FORM THREE

A trader bought two brands of coffee P and Q. Brand P costs Ksh 80 per kg and brand Q costs Ksh 100 per kg. She mixed the two brands and sold the mixture at Ksh 110 per kilogram. If she made a 25% profit, determine the ratio P:Q per kilogram in the mixture. (3 marks)

WEDNESDAY, 07th December, 2022

FORM ONE

Town **B** is 70 km N50^{0}W of town **A** while town **C** is due east of town **B** at a distance of 120 km. using a scale of 1 cm to represent 10 km, draw a diagram to show the relative positions of towns **A**, **B** and **C**. Hence determine the distance and bearing of town C from town **A**. (4 marks)

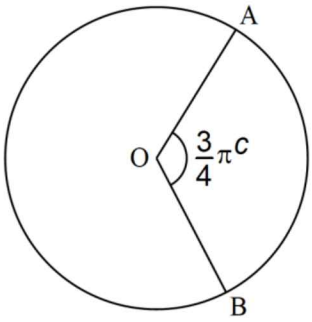
FORM TWO

Solve for n in the equation (3 marks)

$8^{\frac{2}{3}n+3} + 2^{2n+3} - 1 = 67$

FORM THREE

The figure below shows a circle centre O. the length of arc AB is 6.6 cm. The arc AB subtends an angle of $\frac{3}{4}\pi^c$ at the centre of the circle.



Calculate;

a) the radius of the circle. (2 marks)
b) the area of the major sector of the circle. (2 marks)

THURSDAY, 08th December, 2022

FORM ONE

A rectangular box has its internal dimensions of length, width and height as 112 cm, 70 cm and 45 cm respectively. Determine the maximum number of cylindrical canned beef containers of radius 7 cm and height 15 cm that can fit in the box. (3 marks)

FORM TWO

Given that

$\cos\frac{1}{2}\theta^0 - \sin(3\theta - 36)^0 = 0$, for $0^0 \leq \theta \leq 90^0$

a) find θ (2 marks)
b) hence determine the value of $\tan(\theta + 14)^0$ (1 mark)

FORM THREE

A rectangular piece of paper has a length and width of 9.75 cm and 4.5 cm respectively. Calculate the percentage error in the difference between the length and the width of the paper, correct to 3 decimal places. (3 marks)

FRIDAY, 09th December, 2022

FORM ONE

The marked price of a shirt was Ksh. 1,800. Jose sold the shirt to a customer at a discount of 10% and made a profit of Ksh. 324. Calculate the percentage profit. (3 marks)

FORM TWO

Given the points $P(-5,-1)$ and $Q(3,7)$, find the equation of a line that is perpendicular bisector to line PQ in the form $y = mx + c$ and hence state it's y-intercept. (4 marks)

FORM THREE

a) Expand and simplify $\left(1+\frac{1}{4}x\right)^5$ (2 marks)

b) Use the first four terms of the expansion in part a) above to find the approximate value of $(0.75)^5$ (2 marks)
