



THE KENYA NATIONAL EXAMINATIONS COUNCIL
SCHOOL BASED ASSESSMENT

ESSENTIAL MATHEMATICS

(for Regular learners, learners with Physical disability and Hearing Impairment)

Grade 10 – 2026

Duration: 2 hours

Name: _____ **Assessment No.:** _____

School: _____ **Signature:** _____

Instructions

- (i) Attempt **ALL** the questions.
- (ii) Write your answers **clearly** in the spaces provided in this booklet.
- (iii) Non-programmable calculators may be used.
- (iv) For π , use either the calculator value or 3.142.
- (v) Use **blue or black ink** only.
- (vi) All responses must be written in **English**.

For Teacher's Use Only

	Max. Score	Learner's score
Task 1 Nos. 1,2,21	4	
Task 2 Nos.3,4,5,22	5	
Task 3 Nos. 6-8, 23-26	18	
Task 4 Nos. 9-18, 27-34	27	
Task 5 Nos.19,20,35	6	
Total	60	

This paper has 12 printed pages.

Turn over

1. A farmer put 28 fish in a new pond. The population of fish increased by a factor of 3 every year. Which of the following expressions shows the population of the fish after 2 years?
 - A. 28×2^3
 - B. 28×3^2
 - C. $28 + 3^2$
 - D. 3×28^2

2. A nurse set the temperature of a vaccine fridge as -4.5°C . A blackout caused the temperature to rise by $5\frac{3}{4}^\circ\text{C}$. What is the new temperature in the fridge?
 - A. 1.25°C
 - B. -1.25°C
 - C. -10.25°C
 - D. 10.25°C

3. A carpenter designed a dining tabletop that was 1.5 m long and 0.9 m wide. The top included a border x cm wide along the edges. Which of the following expressions gives the area of the part of the table without the border?
 - A. $1.35 - 4.8x - 4x^2$
 - B. $1.35 - 2.4x + x^2$
 - C. $1.35 + 1.2x + 4x^2$
 - D. $1.35 - 4.8x + 4x^2$

4. The length of a flower garden is 2 m less than twice the width. The area of the garden is 60 m^2 . What is the length of the flower garden?
 - A. 5 m
 - B. 6 m
 - C. 8 m
 - D. 10 m

5. A farmer has a cow which is 4 years 8 months older than a heifer. The product of their ages are 8 years. Which of the following equations represents the information?
 - A. $3x^2 + 14x - 8 = 0$
 - B. $3x^2 + 14x + 24 = 0$
 - C. $3x^2 + 14x - 24 = 0$
 - D. $x^2 + 14x - 24 = 0$

6. A dressing mirror in Kawira's house is fixed vertically on a wall. Kawira stands 1.4 m in front of the mirror. How far is the image from Kawira?
 - A. 0.7 m
 - B. 1.4 m
 - C. 2.8 m
 - D. 4.2 m

7. A model of a building is constructed using a scale of 1:500. The height of a room in the model is 5 cm long. What is the actual height of the room in metres?
- A. 25000
B. 2500
C. 250
D. 25
8. The capacities of two similar wine glasses are 54 ml and 250 ml. The height of the smaller glass is 6 cm. What is the height of the larger glass?
- A. 3 cm
B. 5 cm
C. 10 cm
D. 15 cm
9. Grade 10 learners made party hats shaped like a cone using cardboard. Each hat had a height of 21 cm and a radius of 10 cm. After the party they filled the hats with soil to plant vegetable seedlings. What is the maximum volume of soil each hat could hold?
- A. 1319 cm^3
B. 2199 cm^3
C. 6597 cm^3
D. 8796 cm^3
10. A flagpole is 6 m tall. The pole casts a shadow of 8 m long on the ground. What is the angle of elevation of the sun from the end of the shadow?
- A. 36.9°
B. 41.4°
C. 48.6°
D. 53.1°
11. The figure shows a box in the shape of a cuboid.



Tom had some cylindrical tins packed in the box. The cylinders have similar heights of 20 cm and diameters of 15 cm. What is the maximum number of cylinders that can completely fit inside the box?

- A. 8
B. 12
C. 16
D. 20

12. Amos has 3200 cm^3 of liquid paraffin. He poured the paraffin into a cone of radius 10 cm. What is the height of the cone if it was completely filled with paraffin?
 - A. 30.55 cm
 - B. 15.27 cm
 - C. 10.18 cm
 - D. 7.64 cm

13. Learners visited a poultry farm near their school. They noted that the farmer had vaccinated 1020 chicken out of 1200. They were informed that after a certain period 5% of the vaccinated and 60% of the unvaccinated chicken contracted a disease and died. What was his percentage loss?
 - A. 4.25%
 - B. 9.00%
 - C. 13.25%
 - D. 86.75%

14. A mason dug a triangular pipeline. The two lengths and the included angle of the pipeline were 50 m, 70 m and 80° . What was the area of the pipeline?
 - A. 1723.41 m^2
 - B. 3446.83 m^2
 - C. 861.71 m^2
 - D. 303.88 m^2

15. Patel bought a cap which had a hemispherical shape. The radius of the cap was 6.5 cm. What was the area of the curved hemispherical surface, correct to 2 decimal places?
 - A. 1150.35 cm^2
 - B. 575.17 cm^2
 - C. 530.93 cm^2
 - D. 265.46 cm^2

16. An ice cream vendor bought conical cups for his business venture. The radius of the cone is 3 cm and the vertical height is 10 cm. What is the volume of the cups?
 - A. 94.25 cm^3
 - B. 188.50 cm^3
 - C. 282.74 cm^3
 - D. 376.99 cm^3

17. A manufacturer sells a packet of fruit juice to a wholesaler at a profit of 40%. The wholesaler sells the fruit juice for sh 84 making a profit of 20%. What is the cost of manufacturing the fruit juice?
 - A. sh 105
 - B. sh 98
 - C. sh 70
 - D. sh 50

18. A commercial bank buys and sells 100 Japanese Yen in Kenya shillings at the rates shown.

Japanese Yen	Buying	Selling
100 Yen	Ksh 81.54	Ksh 83.96

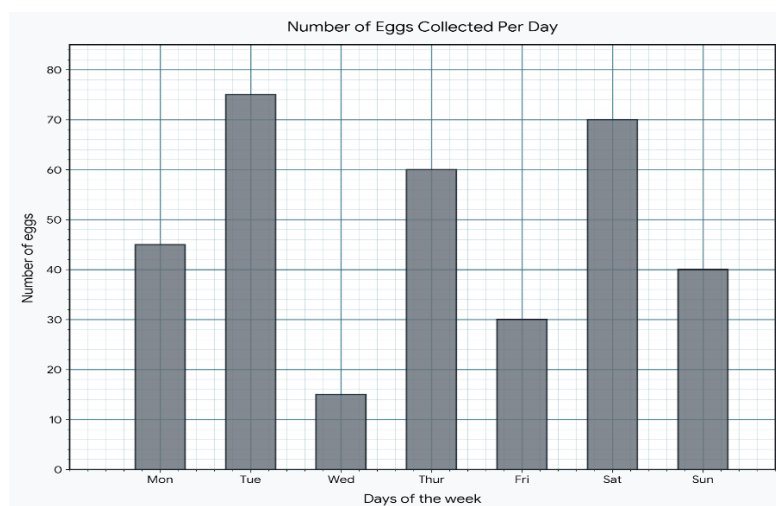
A tourist ended his tour in Kenya and was left with Ksh 20 000 which he converted to Japanese yen through the commercial bank. How many Japanese yen, to the nearest whole number, did he get?

- A. 16 308
 B. 16 792
 C. 24 528
 D. 23 821
19. The table shows the mean marks of different sections in a test. The mean mark of section II is missing.

Section	Number of questions	Mean mark (%)
I	43	65.18
II	48	
III	45	62.37

The mean mark of the test is 64.22%. What is the missing mean mark of section II, correct to 2 decimal places?

- A. 65.11
 B. 65.09
 C. 63.33
 D. 63.78
20. The number of eggs Liza sold in a week was represented as shown.

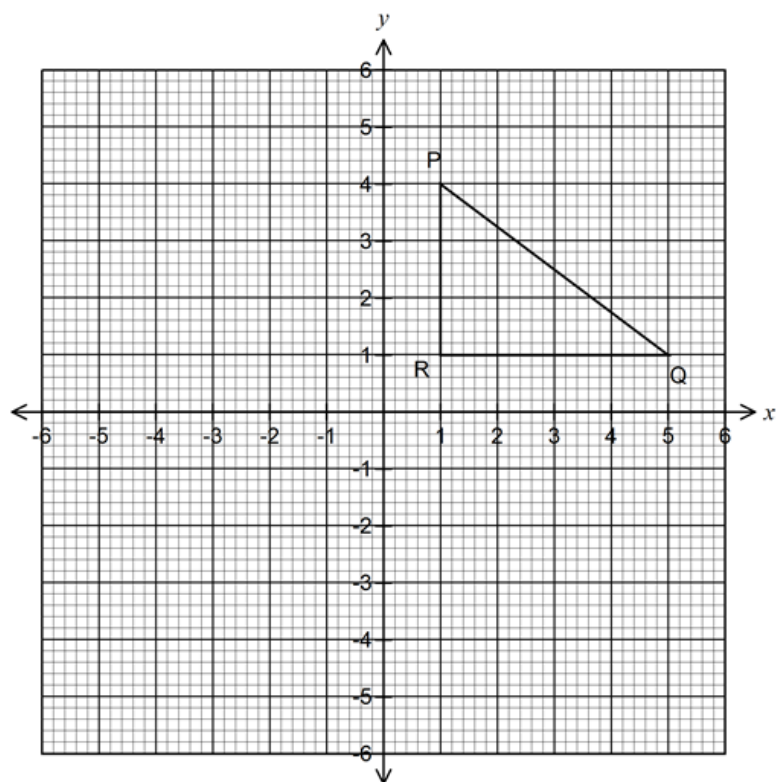


In which three consecutive days were the highest total number of eggs sold?

- A. Monday, Tuesday, Wednesday.
 B. Tuesday, Thursday, Saturday.
 C. Wednesday, Thursday, Friday.
 D. Thursday, Friday, Saturday.

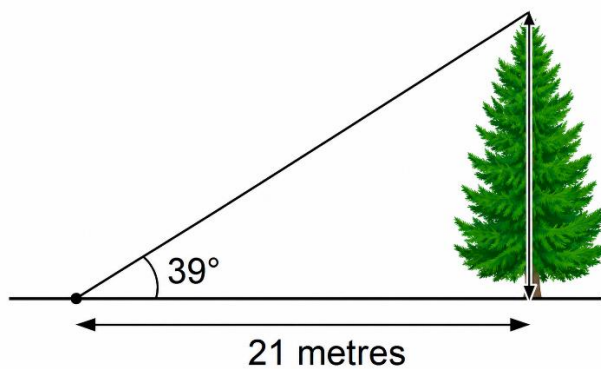
21. A water tap A fills a tank at the rate of 4.5 litres per minute. Another water tap B fills the same tank at the rate of 2 litres per minute. Both taps are opened to fill the tank with water. Use reciprocal to determine the time the taps take to fill 1 litre of water.
(2 marks)
22. Victor is x years old. His brother Fred is four years older than Victor. The product of the ages are 320. The equation representing the information is $x^2 + 4x - 320 = 0$. Solve the quadratic equation to show the ages of Victor and Fred.
(2 marks)
23. A model of a castle was drawn by an architect. The length of one of the castle walls on the model is 5 centimetres. The actual length of the wall is 9 metres.
- (a) The castle has a rectangular kitchen floor of width 8.1 metres. Calculate the width of the kitchen on the model.
(3 marks)
- (b) The area of the model of the kitchen castle is 40 cm^2 . Determine the actual area of the kitchen.
(3 marks)

24. A surveyor drew the following triangle labelled PQR on a cartesian plane.



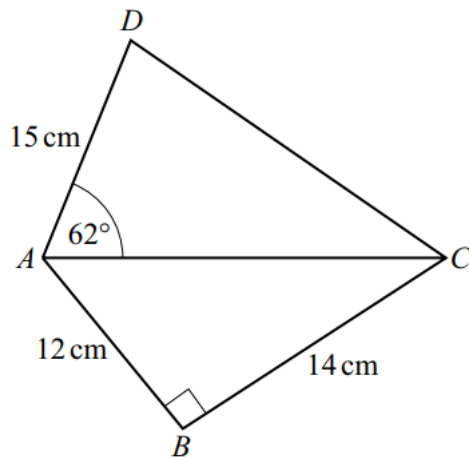
On the grid, draw the image of triangle P'Q'R' after a reflection in the line $y = 0$.
(3 marks)

25. A guest planted a pine tree. The angle of elevation of the top of the tree, from a point on the ground, 21 metres from the base of the tree, was 39° .



Calculate the height of the tree.
(2 marks)

26. Figure ABCD shows a map of a shamba. A farmer divided the shamba into two parts ABC and ACD. ABC is a right-angled triangle in which $AB = 12$ cm, $BC = 14$ cm, $AD = 15$ cm and angle $DAC = 62^\circ$.



Calculate the;

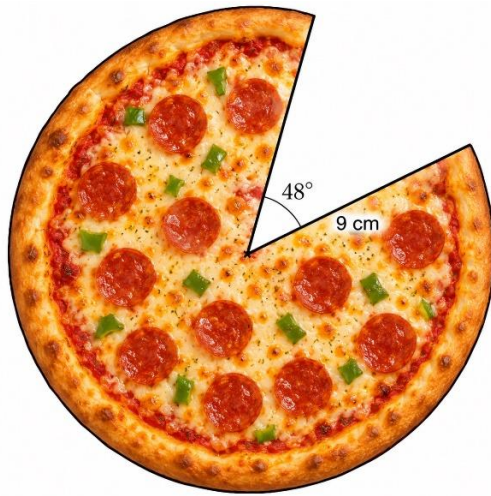
(a) length AC.

(2 marks)

(b) area of triangle ACD.

(2 marks)

27. Jackson made a circular pizza and cut out a section for sale as shown. The radius of the pizza was 9 cm.



Calculate the area of the remaining part of the pizza.

(2 marks)

28. Mike was playing with a basketball on a pitch. The diameter of the ball was 30 cm.
Calculate the surface area of the ball. (2 marks)

29. The figure shows a net of a square based pyramid made from a packet of milk. The length of the square base is 9 cm. The slant height is 6 cm.

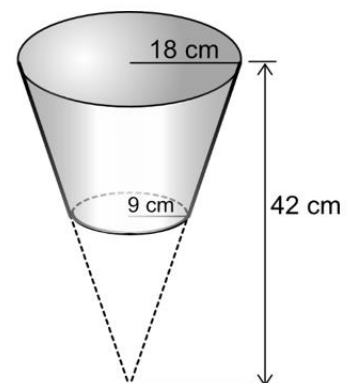


Calculate the surface area of the pyramid.

(2 marks)

Use the figure shown to answer questions 30, 31 and 32

A metal company makes buckets in the shape of a frustum of a cone as shown. The top radius of the frustum is 18 cm and the bottom radius is 9 cm. The height of the larger cone from which the frustum was made was 42 cm.



30. Determine the height of the smaller cone that was cut off to make the frustum.

(2 marks)

31. Calculate the volume of the larger cone.

(2 marks)

32. Calculate the volume of the bucket.

(2 marks)



33. A bus company sells a bus ticket from Nairobi to Kericho at Ksh 1030 per passenger. The bus company sells 10 tickets for the price of 9 tickets. A group of 10 passengers boarded the bus. Calculate the percentage discount given to the 10 passengers.

(3 marks)

34. Trevour works as a bus driver in a company. The table shows his schedule each week.

Day	Working hours
Monday	No hours
Tuesday	No hours
Wednesday	1800 to 2200 h
Thursday	1800 to 2200 h
Friday	1200 to 1730 h
Saturday	1200 to 1730 h
Sunday	1300 to 1800 h

Trevor is paid a commission of Ksh150 per hour for the time he works before 1800 h. He is also paid 30% more per hour for the time he works after 1800 h. Determine the amount of money Trevor is paid as commission each week. (2 marks)

35. A group of learners were asked by a health worker to measure their heights to calculate their Body Mass Index (BMI). The height measured were as follows:

155 150 148 160 155
152 160 152 150 148
158 155 150 155 147

- (a) Make a frequency distribution table for the data. (2 marks)

- (b) Determine the mean. (2 marks)

THIS IS THE LAST PRINTED PAGE.