KENYA CERTIFICATE OF BASIC EDUCATION

SENIOR SCHOOL ASSESSMENT

AUGUST ASSIGNMENT 2026

GRADE 10 – CORE MATHEMATICS 006 JUNE

Time: 2 Hours

LEARNER'S DETAILS

Name: _____. **School:** _____.

Assessment Number: _____. **Date:** _____.

School Code: _____. **Signature:** _____.

INSTRUCTIONS TO CANDIDATES

1. Write your name in the spaces provided above.
2. Write the name of your school and your stream.
3. Write your admission number and date.
4. This paper consists of two sections: A and B.
5. Answer all questions.
6. Show your working clearly.
7. All answers must be written in the spaces provided.
8. Do NOT remove any page.

FOR OFFICIAL USE ONLY

SECTION	SECTION A	SECTION B	% SCORE	EE1	EE2	ME1	ME2	AE1	AE2	BE1	BE2
SCORE RANGE	30 MARKS	50 MARKS		90-100	75-89	58-74	41-57	31-40	21-30	11-20	1-10
POINTS				8 POINTS	7 POINTS	6 POINTS	5 POINTS	4 POINTS	3 POINTS	2 POINTS	1 POINT
LEARNER'S TOTAL SCORE											

SECTION A (30 MARKS)

Answer ALL questions in this section.

1. Agoro Sare School canteen sold **120 snacks** consisting of samosas and sausages. The total amount collected from the sales was **KSh 9,000**. A samosa costs **KSh 60** while a sausage costs **KSh 90**.

Using simultaneous equations, determine:

a) The number of samosas sold. (2 Marks)

b) The number of sausages sold. (2 Marks)

2. The population of bacteria in a laboratory culture is given by the equation:

$N=5\times10^{x}$ where N is the number of bacteria.

If the population grows to **50,000 bacteria**:

a) Form an equation involving logarithms to represent the situation. (1 Mark)

b) Determine the value of x. (3 Marks)

3. Evaluate without a calculator: (2 marks)

(a) $\log_3 81$

(b) $\log_5 125$

9. Solve the equations by Factorisation (6 marks)

(a) $2x^2 + 7x + 3 = 0$

(b) $4x^2 + 4x + 1 = 0$

10. Solve for x: (4 marks)

(a) $\log_3 x = 4$

(b) $\log_2(x + 1) = 5$

11. Factorize $x^4 - 81$ completely. State every factor and explain your steps. (3 marks)

12. A mason is making a triangular window. The base is 2 cm more than twice the height, and the area is 90 cm^2. Find the base and the height of the window. (5 marks)

13. Triangle ABC has sides AB = 6 cm, BC = 8 cm and CA = 10 cm. Triangle A'B'C' is similar to ABC with A'B' = 15 cm.

(a) Find the L.S.F. (2 mark)

(b) Find the lengths of B'C' and C'A'. (4 marks)

(c) Calculate the ratio of the areas of the two triangles. (4 marks)

14. The vertices of a quadrilateral are A (2,2), B(4,2), C(5,4), and D(3,4).

(a) Plot ABCD on the provided graph paper. **[3 mks]**

(b) Reflect ABCD in the line y=−x to obtain A'B'C'D'. **[4 mks]**

(c) State the coordinates of A',B',C', and D'. **[3 mks]**

15. Evaluate without using a calculator. (4 Marks)

$$\frac{\left(1\frac{3}{7}-\frac{5}{8}\right)\times\frac{2}{3}}{\frac{3}{4}+1\frac{5}{7}\div\frac{4}{7}of\,2\frac{1}{3}}$$

16. Find the value of **x** **(**3 Marks)

$2^{(x-3)} \times 8^{(x+2)} = 128$

17. Use logarithms and antilogarithms to evaluate (3 Marks)

$$\sqrt{\frac{391\times687}{372}}$$

18. The x and y –intercepts of a line are given as -2 and -2 respectively determine the equation of the line (3 Marks)

19. The surface area of two similar bottles are $12cm^2$ and $108cm^2$ respectively. If the larger one has a volume of $810cm^3$. Find the volume of the smaller one. (3 Marks)

20. Given $\sin(90 - a) = \frac{1}{2}$, find without using trigonometric tables the value of $\cos a$ (2 Marks)

21. The sides of a triangle are in the ratio 3:5:6. If its perimeter is 56 cm, use the Heroes formula to find its area. (4 Marks)

22. A piece of metal has a volume of 20 cm^3 and a mass of 300g. Calculate the density of the metal in kg/m^3. (3 Marks)

23. The angle of elevation of the top of a tree from a point P on the horizontal ground is 24.5°. From another point Q, five metres nearer to the base of the tree, the angle of elevation of the top of the tree is 33.2°. Calculate to one decimal place, the height of the tree.
(3 Marks)

24. Solve the equation $\frac{1}{4x} = \frac{5}{6x} - 7$ (2 Marks)

25. The base of a right pyramid is a square of sides 4 cm .the slant edges are all 6cm long. ABCDE
(a) Draw and label a sketch of the solid. (3 Marks)

Draw the net of the pyramid (3 Marks)

(b) Use your net to find

(i) The slant height of the pyramid (2 Marks)

(ii) The total surface area of the pyramid (2 Marks)

26. (a) copy and complete the table below: (2 Marks)

x	0	1	2	3	4	5	6
$y = 2x - 4$							
$y = 12 - 2x$							

(b) (i) On the grid provided and using the same axes, draw the lines $y = 2x + 4$ and $y = 12 - 2x$ (3 Marks)

(ii) Hence use your graphs to solve the simultaneous equations

$\frac{1}{2}x - \frac{1}{4}y = 1$

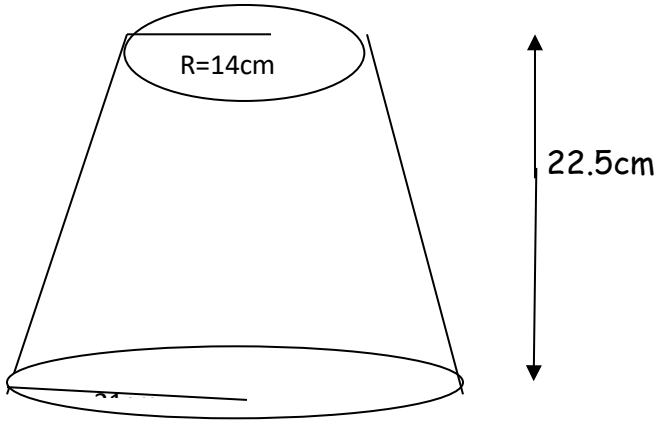
$x + \frac{1}{2}y = 6$ (2 Marks)

(c) By use of substitution method, solve the simultaneous equations;

$6x + 4y = 36$

$x + 3y = 13$ (3 Marks)

27.



The diagram represents a solid frustum with base radius 21cm and top radius 14cm. The frustum is 22.5cm high and is made of a metal whose density is 3g/cm3 $\pi = 22/7$.

a) Calculate

(i) The volume of the metal in the frustrum. (5 marks)

(ii) The mass of the frustrum in kg. (2 marks)

b)The frustrum is melted down and recast into a solid cube. In the process 20% of the metal is lost. Calculate to 2 decimal places the length of each side of the cube.

(3 marks)

28. Jane is a sales executive earning a salary of Ksh. 20,000 and a commission of 8% for the sales in excess of Ksh 100,000. If in January 2010 she earned a total of Ksh.48, 000 in salaries and commissions.

a) Determine the amount of sales she made in that month
(4 Marks)

b) If the total sales in the month of February and March increased by 18% and then dropped by 25% respectively. Calculate

(i) Jane's commission in the month of February (3 Marks)

(ii) Her total earning in the month of March (3 Marks)

29. A surveyor at point S observes the top of a telecommunication mast at an angle of elevation of 22◦. He moves 50 m closer to the mast to point T and finds the new angle of elevation is 35◦.

(a) Represent this information in a detailed diagram. **[4 mks]**

(c) Calculate the height of the mast. **[6 mks]**

30. A farmer has a triangular plot with sides a=150 m, b=170 m, and c=190 m.

(a) Use Heron's formula to calculate the area of the plot. **[6 mks]**

(b) The farmer decides to fence a smaller section that is a regular hexagon with a side length of 10 m. Calculate the area of this hexagon. **[4 mks]**

31. Triangle T has vertices (1,2),(3,2), and (1,5).

(a) Rotate T by 180◦ about the origin to get T1. **[3 mks]**

(b) Reflect T1 in the line x=0 to get T2. **[3 mks]**

(c) Is T2 directly or indirectly congruent to T? Explain your answer by comparing the orientation. **[4 mks]**

MARKING SCHEME

1.

Let:

- ✓ samosas = x
- ✓ sausages = y

$x + y = 120$ $60x + 90y = 9000$

Divide second equation by 30:

$$2x + 3y = 300$$

Substitute $x = 120 - y$:

$2(120 - y) + 3y = 300$ $240 - 2y + 3y = 300$ $240 + y = 300$ $y = 60$

So:

$$x = 120 - 60 = 60$$

Answers:

a) Samosas = **60**
b) Sausages = **60**

2.

$$N = 5 \times 10^x, \quad N = 50000$$

(a)

$50000 = 5 \times 10^x$ $\log 50000 = \log(5 \times 10^x)$ $\log 50000 = \log 5 + x$

(b)

$50000 = 5 \times 10^x$ $10000 = 10^x$ $x = 4$

Answers:

a) $\log 50000 = \log 5 + x$
b) **x = 4**

3.

a) $\log_3 81 = 4$ (since $3^4 = 81$)
b) $\log_5 125 = 3$ (since $5^3 = 125$)

9. Factorisation

(a)

$2x^2 + 7x + 3$ $(2x + 1)(x + 3) = 0$ $x = -\frac{1}{2}, -3$

(b)

$4x^2 + 4x + 1 = (2x + 1)^2$ $x = -\frac{1}{2}$

10. Solve logs

(a)

$$\log_3 x = 4 \Rightarrow x = 3^4 = 81$$

(b)

$$\log_2(x + 1) = 5 \Rightarrow x + 1 = 32 \Rightarrow x = 31$$

11.

$x^4 - 81 = (x^2 - 9)(x^2 + 9) = (x - 3)(x + 3)(x^2 + 9)$

12. Triangle (window)

Let height = h, base = 2h + 2

$\frac{1}{2}(2h + 2)h = 90$ $(2h + 2)h = 180$ $2h^2 + 2h - 180 = 0$

Divide by 2:

$h^2 + h - 90 = 0$ $(h + 10)(h - 9) = 0$ $h = 9$

Base:

$$b = 2(9) + 2 = 20$$

Answer:

Height = **9 cm**, Base = **20 cm**

13.

Scale factor:

$$k = \frac{15}{6} = 2.5$$

(b)

- ✓ $B'C' = 8 \times 2.5 = 20$ cm
- ✓ $C'A' = 10 \times 2.5 = 25$ cm

(c)

Area ratio:

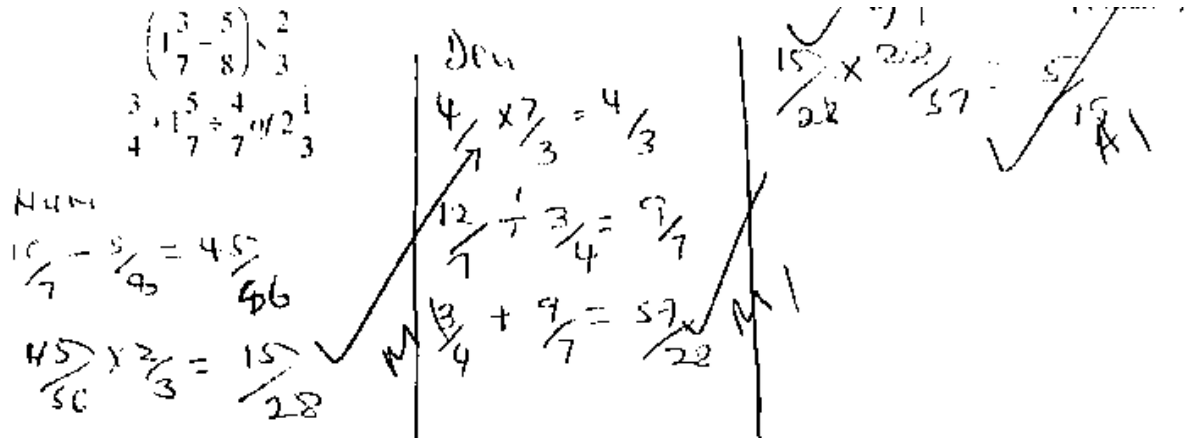
$$k^2 = 6.25$$

14.

Rule: $(x, y) \rightarrow (-y, -x)$

- ✓ A(2,2) → (-2,-2)
- ✓ B(4,2) → (-2,-4)
- ✓ C(5,4) → (-4,-5)
- ✓ D(3,4) → (-4,-3)

15.



16.

$2(x-3)\cdot 8(x+2)=128\ 16(x-3)(x+2)=128\ (x-3)(x+2)=8\ x^2-x-14=0\ x=\frac{1\pm\sqrt{57}}{2}$

17.

$$\frac{391\times 687}{372}$$

Prime factors:

- ✓ 391 = 17 × 23
- ✓ 372 = 3 × 4 × 31

Simplified:

$$\frac{17\times 23\times 229}{12\times 31}$$

18.

Intercepts: (-2,0), (0,-2)

Slope:

$$m=-1$$

Equation:

$$y=-x-2$$

19.

Surface ratio:

$$12:108=1:9$$

Volume ratio:

$$1:27$$

Small volume:

$$\frac{810}{27}=30\ \text{cm}^3$$

20.

$$\sin(90 - a) = \cos a$$

So:

$$\cos a = \frac{1}{2}$$

21.

Sides: 12, 20, 24
Semi-perimeter:

$s = 28$ $A = \sqrt{28(16)(8)(4)} = \sqrt{14336}$ $A \approx 119.7$ cm^2

22. Density

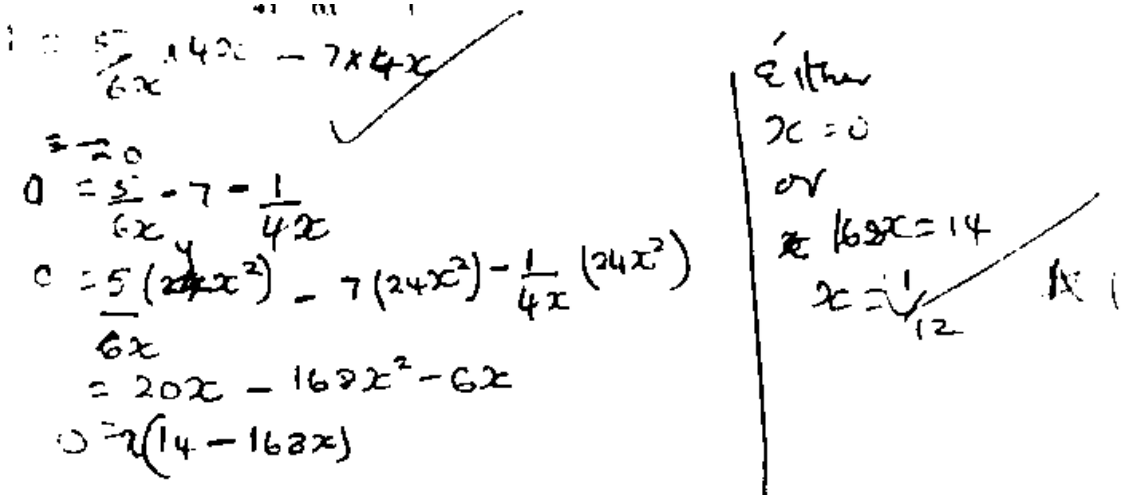
$300g = 0.3kg$ $20cm^3 = 2 \times 10^{-5}m^3$ $\rho = \frac{0.3}{2\times10^{-5}} = 15000\, kg/m^3$

23. Height of tree

Result:

$$h \approx 7.5 \text{ m}$$

24.



25.

Slant height:

$$l = \sqrt{36 - 4} = 4\sqrt{2}$$

Surface area:

$$16 + 32\sqrt{2}$$

26

(a)

Completed values given in table.

(b)

Simultaneous:

$$x = 4,\ y = 4$$

(c)

$$x = 4,\ y = 3$$

27. Frustum

(i) Volume:

$$V = 21945 \text{ cm}^3$$

(ii) Mass:

$$65.835 \text{ kg}$$

(b) Cube side:

$$\approx 37.4 \text{ cm}$$

28.

Sales:

$$KSh450{,}000$$

February commission:

$$KSh34{,}480$$

March earnings:

$$KSh43{,}860$$

29.

Height:

$$h \approx 47.8 \text{ m}$$

30

(a) Triangle area:

$$\approx 12{,}163 \text{ m}^2$$

(b) Hexagon:

$$150\sqrt{3} \approx 259.8 \text{ m}^2$$

31

(a) 180° rotation:

(-1,-2), (-3,-2), (-1,-5)

(b) reflection x=0:

(1,-2), (3,-2), (1,-5)

(c)

Indirectly congruent (orientation changes)