FIRST TERM EXAMINATION
SUBJECT: MATHEMATICS
CLASS: JHS 3
2 hours
SECTION B
Answer only four questions from this section.
[60 marks]

1. (a) In a class of 60 students, the number of students who like Mathematics is 15 more than the number who like science. 12 like both Mathematics and science and 9 do not like any of the two subjects.
   (i) Illustrate the information on Venn diagram.
   (ii) Find the number of students who like science.
   (iii) How many students like exactly one of the two subjects?

   (b) Simplify $\frac{2x-1}{4} - \frac{x-2}{3}$

3. (a) Plot of land measured 90m by 60m. A farmer cultivated corn on $\frac{2}{5}$ of the land, and tomato on $\frac{3}{4}$ of the remaining portion. Calculate:
   (i) the area of the land.
   (ii) the fraction of the land used to cultivate tomatoes.
   The area of the land left uncultivated.

   (b) If $\frac{5}{10}$ of a number if 10 greater than $\frac{1}{3}$ of the same number, find the number.

3. (a) Using a scale off 2cm to 1 unit on both axes, draw two perpendicular axis OX and OY on a graph sheet. Label the x-axis from -5 to 5 and the Y-axis from -6 to 6.

   (b) Draw on the same graph sheet, indicating all vertices and their coordinates.
   (i) ΔABC with vertices A(2, 1) B(1, 4) and C(-1, 2).
   (ii) The image $\Delta A_1B_1C_1$ of ΔABC under a reflection in the line y = 0 where $A \rightarrow A_1$, $B \rightarrow B_1$ and $C \rightarrow C_1$
   (iii) The image $\Delta A_2B_2C_2$ of ΔABC under translation by vector $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$ where $A \rightarrow A_2$, $B \rightarrow B_2$ and $C \rightarrow C_2$.
   (iv) The image $\Delta A_3B_3C_3$ of ΔABC under an anticlockwise rotation of 90^0 about the origin where $A \rightarrow A_3$, $B \rightarrow B_3$ and $C \rightarrow C_3$.
   (v) What single transformation maps $\Delta A_2B_2C_2$ to $\Delta A_3B_3C_3$ where $A_1 \rightarrow A_3$, $B_1 \rightarrow B_3$ and $C_1 \rightarrow C_3$.

4. (a) The letters in the word MATHEMATICS is placed on a box. What is the probability of taking out a letter that is
   (i) a vowel?
   (ii) M?

   (b) A profit of GH¢189.00 was shared between a group of 3 boys and 4 girls in the ratio 5:2 respectively.
   (i) How much did each group receive?
   (ii) If the girls shared their profit equally, how much did each girl receive?

   (c) Solve the equation: $\frac{4x+5}{5} + \frac{x+3}{4} = -1$

5. The table below shows the marks obtained by some students in a test.

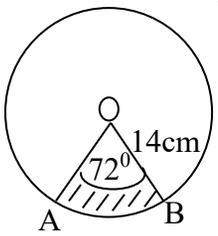
Marks	2	3	4	5	6	7	8
Frequency	2	4	6	4	1	5	3

(a) Find the
(i) mean mark
(ii) modal mark

(b) If the pass mark is 6, find the percentage of students who passed the test.

(c) If a student is selected at random from the class, find the probability that he or she obtained more than 5 marks.

6. (a) The diagram below represents a circle which subtends on angle, 72^0 at the centre of the circle and radius 14cm



(i) Calculate the perimeter of the mirror arc AB.
(ii) Find the area of the mirror sector AOB [Take $\pi = \frac{22}{7}$]

(b) Fati bought a computer for GH¢65000.00. After one year the computer was valued at 75% of the cost price.
(i) What was the value of the computer after one year?
(ii) If she sold her computer for GH¢55000.00, calculate her profit or loss over the

SECTION A

Answer all questions from this section.

1. If M = {2, 4, 6, 8, 10} and N = {4, 5, 6, 7, 8, 9}. Find M ∩N
A. {4, 6, 8}
B. {4, 8}
C. {2, 4, 6, 7, 8, 9, 10}
D. {4, 6}

2. If $0.000689 = 6.89 + 10^n$, find the value of n.
A. -4 B. -3
C. 3 D. 4

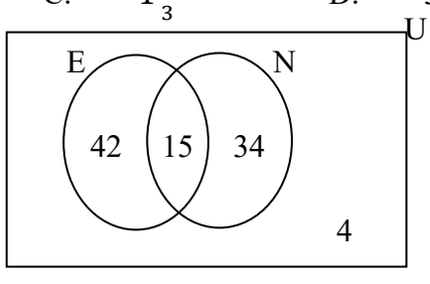
3. Evaluate $\frac{1}{2}[(7 - 3) – (4 - 10)]$
A. -5 B. -1
C. 1 D. 5

4. If -1(x - 1) = -2, find the value of x.
A. 3 B. 2
C. -2 D. -3

5. Expand (t - 1)(t + 1) - 1
S. $t^2 + 1$ B. $t^2 - 1$
C. $t^2 + 2$ D. $t^2 - 2$

6. Ibrahim and Ama share GH¢1,500.00 between them in the ratio 2:3. Find Ama's share
A. GH¢300.00
B. GH¢500.00
C. GH¢600.00
D. GH¢900.00

7. If $\frac{1}{t} = \frac{1}{3}$, find the value of t.
A. $\frac{1}{3}$ B. 1
C. $1\frac{1}{3}$ D. 3



The Venn diagram represent the number of people who speak English or Hausa or neither of the two languages in a village. Use the information to answer questions 8 and 9

8. How many people speak English off only Hausa?
   A. 42 B. 57
   C. 76 D. 91

9. Find the number of people in the village.
   A. 53 B. 80
   C. 96 D. 95

10. What is the total cost of p books off GGH¢7.00 each and q books of GH¢1.20 each?
   A. 7p + 1.20q
   B. 7q + 1.20p
   C. 7(p _ 1.20q)
   D. 1.20(7p + q)

11. Write $\frac{1}{2}$% as a decimal numeral.
   A. 0.5 B. 0.05
   C. 0.005 D. 0.0005

12. Solve (3m - 1) + 2 ≤ 14 + 4m
   A. m >, -14 B. m ≤ -14
   C. m >, -13 D. m ≤ -13

13. What is the image off 3 under the mapping x → 3x + 7 ?
   A. 10 B. 13
   C. 16 D. 24

14. Simplify 4^4 x 2^6
   A. 2^{10} B. 2^{14}
   C. 2^{15} D. 2^{16}

15. Find the slope of the line x – 2y = 11
   A. -3 B. $-\frac{1}{2}$
   C. $\frac{1}{2}$ D. 3

16. What is the area of a square whose diagonal is 14cm?
   A. $7cm^2$ B. $28cm^2$
   C. $49cm^2$ D. $98cm^2$

17. The data shows the marks obtained by students in a class test:

21, 32, 16, 27, 22, 19, 10,. Use the information to answer question 17 and 18

17. Find the median mark.
   A. 16 B. 19
   C. 21 D. 22

18. Calculate the mean.
   A. 16 B. 19
   C. 21 D. 22

19. There are 6 men and 4 women in an escalator. What is the probability that the first person that comes out is a woman?
   A. $\frac{7}{10}$ B. $\frac{1}{4}$
   C. $\frac{2}{5}$ D. $\frac{3}{5}$

20. Factorize 2x2 + 4x + 3xy + 6y completely.
   A. (x + 2)(2x + 3y)
   B. (x + 2)(2x – 3y)
   C. (x + 3)(2x + 3y)
   D. (2x + y)(2x + 3y)

21. Find the simple interest on GH¢2,4480.00 invested for 2 years at a rate of $2\frac{1}{2}$% per annum.
   A. GH¢57.92
   B. GH¢97.92
   C. GH¢122.04
   D. GH¢1224.00

22. Find the image of the point (-1, 4) under the transformation $\begin{pmatrix} x \\ y \end{pmatrix} \rightarrow \begin{pmatrix} 2x \\ -1+y \end{pmatrix}$
   A. (2, -3) B. (-3, 2)
   C. (-2, 3) D. (3, -2)

23. Write down the rule for the mapping.

x	1	2	3	4
↓	↓	↓	↓	↓
y	1	5	9	13

   A. x → 2x + 3
   B. x → 2x -3
   C. x → 4x - 3
   D. x → 4x + 3

24. A(3, 6) and B(2, -3) are points in the Cartesian plane, find the vector $\overrightarrow{AB}$
   A. $\begin{pmatrix} 1 \\ 9 \end{pmatrix}$ B. $\begin{pmatrix} -1 \\ 9 \end{pmatrix}$

C. $\begin{pmatrix} - \\ -9 \end{pmatrix}$ D. $\begin{pmatrix} -1 \\ -9 \end{pmatrix}$

25. Kofi paid GH¢460.00 including 15% VAT for goods he bought from a shop. Find the VAT he paid.
A. GH¢50.00
B. GH¢69.00
C. GH¢460.00
D. GH¢59.00

26. Find the y-intercept of the equation $5x - 2y = 28$.
A. -14 B. $-\frac{5}{2}$
C. $\frac{5}{2}$ D. 14

27. If the image of P under the translation vector $\begin{pmatrix} 3 \\ 7 \end{pmatrix}$ is $P^1(6, 8)$. Find the coordinators of P
A. (9, 15) B. (3, 1)
C. (-3, -1) D. (-9, -15)

28. Find the value of $5 + 2^0 - 1$
A. 3 B. 4
C. 5 D. 6

29. If 27:4x = 9:16. Find the value of x.
A. 6 B. 8
C. 12 D. 16

30. A box contains 6 green and 5 yellow balls. What is the probability of picking a green ball?
A. $\frac{1}{6}$ B. $\frac{6}{11}$
C. $\frac{1}{5}$ D. $\frac{5}{11}$

31. If a = $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$ and b = $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$, find a - b
A. $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$ B. $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$
C. $\begin{pmatrix} -1 \\ 5 \end{pmatrix}$ D. $\begin{pmatrix} -1 \\ -5 \end{pmatrix}$

32. Find the highest common factor of 63 and 81.
A. 9 B. 7
C. 6 D. 21

33. Mary is older than John by 5 years, if John is now x years old, how old was Mary 3 years ago?
A. (x + 2) years
B. (x - 8) years
C. (x -2) years
D. (x - 3) years

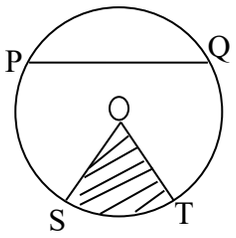
34. Simplify -25 – (-5) + (-20)
A. -20 B. -40
C. 20 D. 40

35. In an examination, 64 pupils out of 80 passed. What percentage of the pupils failed?
A. 16% B. 20%
C. 25% D. 80%

37. Arrange the following fractions in ascending order: $\frac{1}{2}, \frac{1}{8}, \frac{3}{4}, \frac{2}{5}$
A. $\frac{1}{8}, \frac{2}{5}, \frac{1}{2}, \frac{3}{4}$ B. $\frac{1}{8}, \frac{1}{2}, \frac{2}{5}, \frac{3}{4}$
C. $\frac{1}{2}, \frac{1}{8}, \frac{2}{5}, \frac{3}{4}$ D. $\frac{3}{4}, \frac{1}{2}, \frac{2}{5}, \frac{1}{8}$

38. Simplify $(3m)^2 - 3m^2$.
A. 3m B. $3m^2$
C. 6m D. $6m^2$

The diagram show the point P, Q, S and T on a circle with centre O.



39. The line PQ is
A. a radius B. diameter
C. a chord D. an arc

40. The shaded region is
A. triangle B. semi-circle
C. segment D. sector