JH 210 J.H.S.C.E.
May 2010
MATHEMETICS 1 & 2
Objective and Essay Tests

Name .....

Indentification Number .....

THE WEST AFRICAN EXAMINATIONS COUNCIL

Junior High School Certificate Examination

MATHEMATICS

May 2010 — 2 hours

Do **not** *open this booklet until you are told to do so. While you are waiting, read and observe the following instructions carefully. Write your* **name** *and* **identification number** *in the spaces provided above.*

This paper consists of **two** *parts: Paper* 1 *and* 2. *Answer Paper* 1 *on your Objective Test answer sheet and Paper* 2 *in your answer booklet. Paper* 1 *will last* **1** *hour after which the answer sheet will be collected. Do* **not** *start Paper* 2 *until you are told to do so. Paper* 2 *will last* 1 *hour.*

PAPER 1

OBJECTIVE TEST

[60 marks]

1. Use **2B** pencil throughout
2. On the objective answer sheet supplied, provide the following details **correctly**.
   (*a*) Supply the information required in the spaces marked *CENTER NAME, CENTRE No., SCHOOL NAME* and *SCHOOL No*.
   (*b*) In the space marked *STUDENT NAME*, write your **surname** followed by your **other names**. Write your **identification number** in the space marked *STUDENT No.*
   (*c*) In the spaces marked *SUBJECT* and *GRADE*, write *MATHEMATICS* and 9TH in that order.
   (*d*) In the box marked *IDENTIFICATION NUMBER*, provide your **identification number** vertically in the spaces on the left-hand side, and shade each numbered space in line with each digit. This identification number must be the same as the one indicated on your Admission Slip. Repeat the process with the correct information for the box marked *YEAR OF FIRST ENTRY.*
   (*e*) In the box marked *Subject Code*, write the digits 210 vertically in the spaces on the left-hand side. **Shade** the corresponding numbered spaces as you did for your identification number.
3. An example is given below. This is for a female candidate whose *name* is Clara Amina WILLIAMS. Her *identification number* is 101011379, her first entry is in 2010 and she is offering *Mathematics.*

THE WEST AFRICAN EXAMINATIONS COUNCIL - LIBERIA

PRINT IN BLOCK LETTERS

TOM JONES HIGH SCHOOL	891001
CENTER NAME: JOE BLOE JNR. HIGH SCHOOL	CENTER No.: 001011
SCHOOL NAME: WILLIAMS CLARA AMINA	SCHOOL No: 379
STUDENT NAME: MATHEMATICS	STUDENT No: 9TH
SUBJECT	GRADE

IDENTIFICATION NUMBER: 1 0 1 0 1 1 3 7 9

YEAR OF FIRST ENTRY: 2 0 1 0

SUBJECT CODE: 2 1 0

For Supervisors only
If a candidate is absent shade this space.

Shade the space marked
M (for Male) or F (for Female)
In this box — M F

Answer **all** *questions.* **1½ hours**

Paper 1 contains **fifty** objective *questions. Each question is followed by* **four** *options lettered* **A** *to* **D.** *Determine the correct option for each question and then shade in* **pencil** *on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only* **one** *answer to a question.*

An example is given below.

What is the ratio of 15 to 25?
A. 2:3
B. 3:2
C. 3:5
D. 5:3

The correct answer is 3:5, which is letter C, *and therefore answer space* C *would be shaded.*

⊏A⊐ ⊏B⊐ ■C■ ⊏D⊐ ⊏E⊐

Think carefully before you shade the answer spaces; erase completely any answers you wish to change.

Do all rough work on this question paper. Now answer the following questions:

1. Add: 168.3 + 98.432 + 0.875 + 397

A. 564.607
B. 664.607
C. 764.607
D. 864.607

2. Factor: $x^2 - 8x + 16$.

A. $(x + 4)(x + 4)$
B. $(x - 4)(x - 4)$
C. $(x + 2)(x - 8)$
D. $(x - 2)(x - 8)$

3. A man gives $1,440.00 to be shared by his three sons in the ratio of their ages. If their ages are 8, 6 and 4 years respectively, how much will the youngest son receive?

A. $80.00
B. $90.00
C. $320.00
D. $340.00

4. If P ={all students who ride a taxi to school}, and Q={all students who always walk to school}, what is $P \cap Q$?

A. {both boys and girls}
B. {none of the students}
C. {all the boys in the school}
D. {all the girls in the school}

5. At what yearly rate will an amount of $90.00 earn a simple interest of $15.00 in 4 years?

A. 5%
B. 6%
C. 7%
D. 8%

6. Subtract: $(-5x^2 + 6x - 2)$ from $(4x^2 - 2x - 1)$.

A. $(9x^2 + 8x - 1)$
B. $(9x^2 + 8x - 3)$
C. $(9x^2 - 4x + 3)$
D. $(9x^2 - 8x + 1)$

7. Simplify $x^2 + 16x + x^2 - 10x$.

A. $2x(x + 6)$
B. $2x(x - 6)$
C. $2x(x + 3)$
D. $2x(x - 3)$

8. What is the solution of the inequality $27 + 2x < 11$?

A. $x < -19$
B. $x < -8$
C. $x > 8$
D. $x > 19$

9. Solve for x in : $\frac{2}{5}(x+3) = \frac{4}{5}(x+7)$.

A. -17
B. -11
C. 25
D. 28

10. Add: $54_{(eight)} + 67_{(eight)}$

A. $143_{(eight)}$
B. $133_{(eight)}$
C. $131_{(eight)}$
D. $121_{(eight)}$

11. How many sides are there in a regular polygon with an interior angle of 120°?

A. 6
B. 8
C. 12
D. 16

12. Express 60500 in standard form.

A. 6.05×10^{-4}
B. 6.05×10^{-3}
C. 6.05×10^{3}
D. 6.05×10^{4}

13. Simplify: $\frac{2x+1}{2} - \frac{3x-7}{9} - \frac{5}{18}$

A. $(2x+3)/3$
B. $(2x+1)/3$
C. $(2x+6)/3$
D. $(2x+18)/3$

14. Make A the subject of the equation $D = \frac{h}{A-2}$.

A. $(h+2D)/D$
B. $(h-2D)/D$
C. $h/(D-2)$
D. $h/(D+2)$

The data below represent scores of some students in a class. Use it to answer questions **15** *and* **16**.
12,8,8,17,12,8,2,18,14

15. What is the range of the scores?

A 6
B 8
C 16
D 18

16. What is the probability of selecting a score less than 12 from the given data?

A. 1/9
B. 2/9
C. 3/9
D. 4/9

17. Factorize $x^2 - 5x - 6$.

A. $(x-3)(x+2)$
B. $(x+3)(x-2)$
C. $(x-6)(x-1)$
D. $(x-6)(x+1)$

18. What is the sum of the interior angles of a six sided polygon?

A. 480°
B. 540°
C. 720°
D. 960°

19. Abraham received a 5% commission on all the sales he made. If his sales amounted to \$200.20, how much was his commission?

A. 50.01
B. 40.04
C. 21.02
D. 10.01

20. Sam can paint a room in 20 minutes while Moses can do the same work in 30 minutes. How long would it take them to paint this room together?

A. 10 minutes
B. 12 minutes
C. 18 minutes
D. 24 minutes

21. A triangle with two equal sides is called

A. a right triangle .
B. an obtuse triangle .
C. an isosceles triangle .
D. an equilateral triangle.

22. How many sides are there in a nonagon?

A. 7
B. 6
C. 8
D. 9

Turn over

9. Solve for x in : $\frac{2}{5}(x+3) = \frac{4}{5}(x+7)$.

A. -17
B. -11
C. 25
D. 28

10. Add: $54_{(eight)} + 67_{(eight)}$

A. $143_{(eight)}$
B. $133_{(eight)}$
C. $131_{(eight)}$
D. $121_{(eight)}$

11. How many sides are there in a regular polygon with an interior angle of 120°?

A. 6
B. 8
C. 12
D. 16

12. Express 60500 in standard form.

A. 6.05×10^{-4}
B. 6.05×10^{-3}
C. 6.05×10^{3}
D. 6.05×10^{4}

13. Simplify: $\frac{2x+1}{2} - \frac{3x-7}{9} - \frac{5}{18}$

A. $(2x+3)/3$
B. $(2x+1)/3$
C. $(2x+6)/3$
D. $(2x+18)/3$

14. Make A the subject of the equation $D = \frac{h}{A-2}$.

A. $(h+2D)/D$
B. $(h-2D)/D$
C. $h/(D-2)$
D. $h/(D+2)$

The data below represent scores of some students in a class. Use it to answer questions **15** *and* **16**.
12,8,8,17,12,8,2,18,14

15. What is the range of the scores?

A 6
B 8
C 16
D 18

16. What is the probability of selecting a score less than 12 from the given data?

A. 1/9
B. 2/9
C. 3/9
D. 4/9

17. Factorize $x^2 - 5x - 6$.

A. $(x-3)(x+2)$
B. $(x+3)(x-2)$
C. $(x-6)(x-1)$
D. $(x-6)(x+1)$

18. What is the sum of the interior angles of a six sided polygon?

A. 480°
B. 540°
C. 720°
D. 960°

19. Abraham received a 5% commission on all the sales he made. If his sales amounted to $200.20, how much was his commission?

A. 50.01
B. 40.04
C. 21.02
D. 10.01

20. Sam can paint a room in 20 minutes while Moses can do the same work in 30 minutes. How long would it take them to paint this room together?

A. 10 minutes
B. 12 minutes
C. 18 minutes
D. 24 minutes

21. A triangle with two equal sides is called

A. a right triangle .
B. an obtuse triangle .
C. an isosceles triangle .
D. an equilateral triangle.

22. How many sides are there in a nonagon?

A. 7
B. 6
C. 8
D. 9

Turn over

23. Determine the perimeter of a square whose side is 5cm.

A. 10cm
B. 15cm
C. 20cm
D. 25cm

24. Simplify $(x^6)^2$.

A. $9x^2$
B. $6x^2$
C. $9x^{12}$
D. $6x^{12}$

25. Find the square root of 4×121.

A. 52
B. 42
C. 32
D. 22

26. An ice box was sold for $360.00 after a discount of $40.00 was allowed. What was the marked price for the icebox?

A. $140.00
B. $240.00
C. $320.00
D. $400.00

27. Which of the following represents *three million, two hundred thousand and forty-one?*

A. 3,240,041
B. 3,200,041
C. 3,240,401
D. 3,200,401

28. Find the complement of 69°17'.

A. 20°43'
B. 21°43'
C. 101°43'
D. 111°43'

29. A boy can travel 10 miles on his bicycle in 2 hours. At the same rate, how far can he travel in 5 hours?

A. 40 miles
B. 35 miles
C. 30 miles
D. 25 miles

30. Simplify $(-2a^2b^4)^5$.

A. $-32a^{10}b^{20}$
B. $32a^7b^9$
C. $-10a^{10}b^{20}$
D. $10a^7b^9$

31. Find 0.02% of 84.

A. 0.00168
B. 0.0158
C. 0.0168
D. 0.00158

32. If $\frac{x}{2} = \frac{3x-10}{5}$, find the value of x.

A. 20
B. 30
C. -20
D. -30

33. The prime factorization of 96 is?

A. $2^5 \times 3$
B. $2^4 \times 3^2$
C. $2^3 \times 3^3$
D. $2^2 \times 3^4$

34. Divide $3\frac{1}{5}$ by 4.

A. 4/5
B. 5/4
C. 2/5
D. 5/2

35. Express $\frac{7}{8}$ as a decimal.

A. 0.000875
B. 0.008750
C. 0.087500
D. 0.875000

36. Choose the set of **odd** numbers between 2 and 20 that are multiples of 3.

A. {3,5,7,9,11,13,15,17,19}
B. {3,6,9,15,18}
C. {3,9,15}
D. {3,9,15,18}

37. Find the *greatest common factor* for $8x$, $16x^2$ and $32x^3$.

A. $4x$
B. $8x$
C. $16x^2$
D. $32x^2$

38. A man borrowed \$2,000.00 for one year at a simple interest rate of 8%. How much will he pay at the end of the year?

A. \$160.00
B. \$360.00
C. \$1,840.00
D. \$2,160.00

39. Arrange the following fractions in ascending order of size. $\frac{3}{4}, \frac{1}{8}, \frac{1}{6}$

A. $\frac{1}{8}, \frac{1}{6}, \frac{3}{4}$
B. $\frac{1}{8}, \frac{3}{4}, \frac{1}{6}$
C. $\frac{1}{6}, \frac{3}{4}, \frac{1}{8}$
D. $\frac{3}{4}, \frac{1}{6}, \frac{1}{8}$

40. Find the equation of the line that passes through the point $(-2,3)$ with a slope of 5.

A. $5x + y - 13 = 0$
B. $x - 5y + 13 = 0$
C. $5x - y - 13 = 0$
D. $x + 5y + 13 = 0$

41. Simplify $\sqrt{20} + \sqrt{80} - \sqrt{45}$.

A. $9\sqrt{5}$
B. $3\sqrt{5}$
C. $-5\sqrt{5}$
D. $-3\sqrt{5}$

42. If x varies inversely as y and x = 2 when y = 4, find the value of x when y = 6.

A. 3/4
B. 12
C. 3
D. 4/3

43. The commission on the sale of a house is 15%. What is the commission on a house sold for \$14,000.00?

A. \$1,400.00
B. \$2,100.00
C. \$11,200.00
D. \$11,900.00

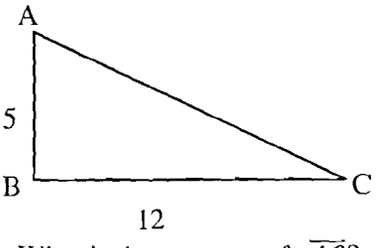
44. Evaluate $2x^2 - 3x + 1$ *when* $x = -1$.

A. 6
B. 0
C. -2
D. -6

45. Simplify $\frac{4x^2-25y^2}{2x^2y+5xy^2} \div \frac{6x^2-15xy}{9x^2y^2}$?

A. $3y$
B. $-3y$
C. $\frac{1}{3y}$
D. $-\frac{1}{3y}$

Use the triangle below to answer questions **46** and **47.**



46. What is the measure of $\overline{AC}$?

A. 7
B. 13
C. 17
D. 20

47. What is the value of SinC?

A. 5/13
B. 12/5
C. 12/13
D. 5/12

48. Mr. David is seven times as old as his son, Koffa. Ten years from now, the sum of their ages will be 60 years. How old is Mr. David now?

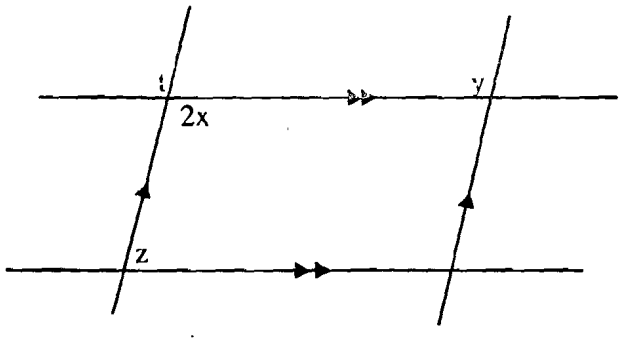
A. 5 years
B. 15 years
C. 35 years
D. 45 years

Turn over

49. Change $1101_{(two)}$ to base ten.

A. 12
B. 13
C. 31
D. 43

Use the diagram below to answer question **50.**



50. If the angle marked y measures 130°, what will be the measure of x?

A. 50°
B. 65°
C. 75°
D. 130°

STOP!

End of the Objective Test

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

YOU WILL BE PENALIZED SEVERELY IF YOU ARE FOUND LOOKING AT THE NEXT PAGE BEFORE YOU ARE TOLD TO DO SO.

PAPER 2

ESSAY **1½ hours**
[60 marks]

Paper 2 of this test consists of ***six*** *essay questions.* Answer any ***four*** *questions* ***only.***
Write your answers in **ink** *(blue or black)* **only.**

For each question, all necessary details of working including rough work and diagrams must be shown with the answer.

Credit will be given for clarity of expression and orderly presentation of material.

1. *(a)* Thirty students in a class were given a test which was marked out of 10. The results of the test are as follow:
4,6,7,5,9,8,6,4,3,5,6,9,8,7,6,10,1,3,6,7,9,8,5,3,2,4,7,9,10,5.

(i) Copy and complete the frequency table below

Marks per student	1	2	3	4	5	6	7	8	9	10
Number of students			3							

(ii) How many students got 5 marks?
(iii) What mark was gotten most frequently?
(iv) What was the mean (average) mark?

(b) Simplify the following:

(i) $\frac{x^2-9}{x^2-x-6}$

(ii) $\frac{1}{4}\sqrt{48}+3\sqrt{75}$

(iii) $\frac{x^2+3x-10}{x^2-4}$

2. *(a)* Two planes leave Monrovia at the same time in opposite directions, one flying west at *750km/h* and the other flying east at *850km/h.* How long will the planes take to be *4000km* apart?

(b) Factor the following **completely** where necessary:

(i) $4ay+xy-4az-xy$
(ii) x^4-16
(iii) $x^5y-3x^4y-18x^3y$

3. *(a)* Make m the subject of the formula $A = \frac{1}{2}d(m+n)$.

(b) The area of a circle is 154cm^2. Taking pi = $\frac{22}{7}$, find the length of the circumference.

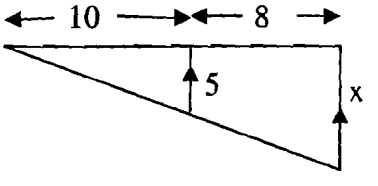
4. *(a)* The supplement of an angle is six times as large as the complement of the angle. Find the measure of the angle.

(b) Fatu is six years older than Kebbeh, and the average of their ages is twice Kebbeh's age. How old are they?

5. *(a)* Mr. Toe received a commission of 15% for selling a car for Mr. Gbotoe. If Mr. Toe received $3,750.00 as commission for the sale, what was the price of the car?

(b) Solve for x in the inequality and illustrate the solution set on the number line. $-(x-3)+4 \leq -2x+5$.

6. *(a)* Find the length of the side marked x in the diagram below.



(b) Given that Sin$\theta = \frac{4}{5}$ and θ is an acute angle, calculate with the help of a diagram, Tanθ.

THE END