

Grade1 PUBLISHERS
FEBRUARY, 2020
MATHEMATICS
2 & 1
ESSAY & OBJECTIVES

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Grade1 PUBLISHERS

Ghana's Leading Educational Consult & Publishers

BASIC EDUCATION CERTIFICATE EXAMINATION MOCK

FEB, 2020

MATHEMATICS

2 HOURS

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

This booklet consists of two papers. Answer paper 2 which comes first in your answer booklet and paper 1 on your objective test answer sheet. Paper 2 will last 1 hour after which the answer booklet will be collected. Do not start paper 1 until you are told to do so. Paper 1 will last 1 hour.

FOR EXAMINER'S USE ONLY

FOR EXAMINER'S USE ONLY	
QUESTION NUMBER	MARK
TOTAL	

SECTION B

ESSAY

1 hour

[60 marks]

*Attempt **four** questions **only** from this section*

All working must be clearly shown.

The use of calculators is not allowed

Marks will not be awarded for correct answers without corresponding working.

All questions carry equal

1. The table shows the distribution of grades of candidates in an examination.

Grade	1	2	3	4	5	6
Frequency	2	3	6	5	4	10

- (a) Using a graph sheet, draw a bar chart for the distribution
- (b) If all candidates who obtained grades above grade 3 were awarded credit, find the probability that a candidate selected at random obtained credit.
- (c) Calculate, correct to the nearest whole number, the mean grade of the candidates.

2. (a) In a class of 70 students, 40 belong to the Red Cross Society, 27 belong to the Girls' Guide Society and 12 belong to both the Red Cross Society and the Girls' Guide Society. The remaining students do not belong to any of the two societies.
- (i) Illustrate the information on a Venn diagram
 - (ii) How many students belong to the Red Cross Society only?
 - (iii) How many students do **not** belong to any of the two societies?
- (b) A farmer uses $\frac{1}{3}$ of his land to plant cassava, $\frac{2}{5}$ of the remaining land to plant maize and the rest vegetables. If vegetables cover an area of 10 acres, what is the total area of the farmer's land.

3. (a) $P = \{\text{factors of } 30\}$ $Q = \{\text{Multiples of } 5 \text{ less than } 40\}$
Find $P \cap Q$
- (b) A trader saved GH¢ 200.00 for 3 years at 12% simple interest per annum.
What will be the total amount in the trader's account at the end of the 3 years?
- (c) Evaluate $\frac{4.56 \times 3.6}{0.12}$ and leave your answer in standard form.

4. (a) A box has length 8.0 cm, width 5.0 cm and height 10.0 cm.
Find the:
- (i) total surface area of the box
 - (ii) the volume of the box.
- (b)
- (i) Using a scale of 2cm to 1 unit on both axes, draw two perpendicular axes Ox and Oy on a graph sheet.
 - (ii) On the same graph sheet mark the x-axis from -5 to 5 and the y-axis from -6 to 6
 - (iii) Plot and join the points $A(0, 3)$, $B(2, 3)$, $C(4, 5)$ to form triangle ABC.
 - (iv) Draw the image $A_1B_1C_1$ of triangle ABC under a translation by the vector $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$
 - (v) Draw the image $A_2B_2C_2$ of triangle ABC under a reflection in the x - axis
5. (a) Using a ruler and a pair of compass only;
- (i) construct triangle PQR such that $|\overline{PR}| = 8\text{cm}$, $|\overline{PQ}| = 6\text{cm}$ and $|\overline{QR}| = 5\text{cm}$;
 - (ii) construct the perpendicular bisector of \overline{PR} and label it ℓ_1 ;
 - (iii) construct the perpendicular bisector of \overline{QR} and label it ℓ_2 ;
 - (iv) Label the point of intersection of ℓ_1 and ℓ_2 as N;
 - (v) With N as centre and radius equal to $|\overline{PN}|$, draw a circle.

- (b) (i) Measure the radius of the circle.
(ii) Calculate the circumference of the circle, correct to 3 significant figures.
[Take $\pi = 3.14$]

6. (a) Solve for x, if $2 - \frac{3}{5}x \leq 1\frac{1}{3}$

- (b) At a rally attended by 520 people, 30% were Fantes, 25% Ewes, 15% Nzemas, 20% Gas and the rest Gonjas
- (i) How many Gonjas were at the rally?
- (ii) How many more Fantes than Nzemas were at the rally ?
- (c) Draw a pie chart to illustrate the information

END OF ESSAY

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.

SECTION A
OBJECTIVE TEST

1 hour

1. List the members of the set $Q = \{\text{prime factors of } 30\}$
 - A. $\{2, 3, 5\}$
 - B. $\{2, 6, 10\}$
 - C. $\{3, 5, 15\}$
 - D. $\{3, 6, 15\}$
2. Given that set $P = \{m, n, o, p\}$, find the number of subsets of P .
 - A. 4
 - B. 8
 - C. 10
 - D. 16
3. If $M = \{\text{multiples of } 4 \text{ between } 10 \text{ and } 25\}$ and $N = \{\text{even numbers between } 11 \text{ and } 23\}$, find $M \cup N$
 - A. $\{12, 16, 20\}$
 - B. $\{14, 18, 22\}$
 - C. $\{12, 14, 16, 18, 22\}$
 - D. $\{12, 14, 16, 18, 20, 22, 24\}$
4. Express 4037 in standard form
 - A) 4.037×10^{-4}
 - B) 4.037×10^{-3}
 - C) 4.037×10^3
 - D) 4.037×10^4
5. Find the Highest Common Factor of 24, 42 and 72
 - A. 4
 - B. 6
 - C. 7
 - D. 12
6. Solve the inequality: $7x - (10x + 3) \geq -9$
 - A) $x \geq 2$
 - B) $x \leq 4$
 - C) $x \geq 4$
 - D) $x \leq 2$

7. Factorize completely $b^2 + fb - mb - fm$

A. $(b - f)(b - m)$

B. $(b + f)(b - m)$

C. $(b + f)(m - b)$

D. $(b + f)(m + b)$

8. How many integers are within the interval $-5 < x < 7$?

A. 10

B. 11

C. 12

D. 13

9. Simplify: $-13 - (-3) + (-10)$

A. -26

B. -20

C. -10

D. -6

10. Arrange the following fractions in ascending order: $\frac{5}{8}, \frac{11}{20}, \frac{7}{10}$

A. $\frac{5}{8}, \frac{11}{20}, \frac{7}{10}$

B. $\frac{7}{10}, \frac{5}{8}, \frac{11}{20}$

C. $\frac{11}{20}, \frac{5}{8}, \frac{7}{10}$

D. $\frac{5}{8}, \frac{7}{10}, \frac{11}{20}$

11. Abena spent $\frac{1}{5}$ of her money on sweets, $\frac{4}{7}$ on provisions and the rest on gari. What fraction of her money did she spend on gari?

A. $\frac{27}{35}$

B. $\frac{13}{35}$

C. $\frac{8}{35}$

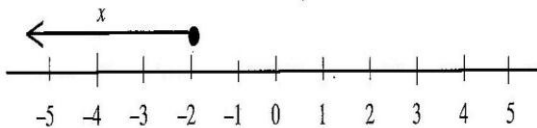
D. $\frac{5}{35}$

12. If 5 boys took 14 days to cultivate a piece of land, how long will it take 7 boys working at the same rate to cultivate the land ?

- A. 14 days
- B. 12 days
- C. 10 days
- D. 8 days

13. A man invested GHC 800.00 in a bank at a simple interest rate of 5% per annum. Find his total amount in the bank at the end of one year.
- A. GHC 840.00
 - B. GHC 860.00
 - C. GHC 900.00
 - D. GHC 960.00
14. John sold a car for GHC 60,000.00 and made a profit of 20%. What is the cost price of the car?
- A. GHC 48,000.00
 - B. GHC 50,000.00
 - C. GHC 72,000.00
 - D. GHC 132,000.00

15. Which of the following expressions is illustrated on the number line?



- A. $x \leq -2$
 - B. $x < -2$
 - C. $x \geq -2$
 - D. $x > -2$
16. The area of a circle is 154 cm². Find the diameter. (Take $\pi = 22/7$)
- A. 7 cm
 - B. 14 cm
 - C. 21 cm
 - D. 49 cm

Find the median of the numbers 17, 12, 15, 16, 8, 18, 13 and 14

- A. 8

- B. 12
- C. 14.5
- D. 15.5

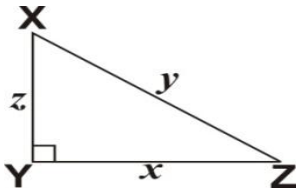
17. The ages in years of 10 children at a party are 2, 3, 3, 3, 4, 4, 5, 5, 5 and 6. If a child is chosen at random, what is the probability that he / she is **not** less than 5 years old ?

- A. $\frac{2}{3}$
- B. $\frac{2}{5}$
- C. $\frac{3}{10}$
- D. $\frac{1}{2}$

18. Expand $(2x + y)(2x - y)$

- A. $2x^2 - y^2$
- B. $4x^2 - y^2$
- C. $2x^2 + 4xy - y^2$
- D. $4x^2 + 4xy - y^2$

19. XYZ is a right-angled triangle with length of sides as shown.



Which of the following equations gives the value of z^2 ?

- A) $z^2 = (x^2 + y^2)$
- B) $z^2 = (x - y)$
- C) $z^2 = (y^2 - x^2)$
- D) $z^2 = (x^2 - y^2)$

20. Evaluate $(3m)^2 - 3m^2$, when $m = 2$.

- A. 12
- B. 18
- C. 20
- D. 24

21. A wrist watch is priced GHC 2,000.00. A shopkeeper allows a discount of 2% on the cost price. Find the discount on 20 of such wrist watches.

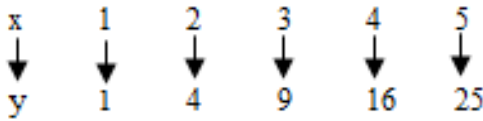
- A. GHC 500.00

- B. GHC 600.00
- C. GHC 800.00
- D. GHC 1,000.00

22. Find the value of m , if $4(m + 4) = -8$.

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

23. Find the rule for the following mapping



- A. $y \rightarrow x+2$
- B. $y \rightarrow 2x$
- C. $y \rightarrow x^2$
- D. $y \rightarrow 2x+2$

24. How many vertices has a cuboid?

- A. 6
- B. 7
- C. 8
- D. 14

25. The circumference of a circle is 440 m. Find the area of the circle. [Take $\pi = \frac{22}{7}$]

- A. $14,400 \text{ m}^2$
- B. $15,400 \text{ m}^2$
- C. $16,400 \text{ m}^2$
- D. $18,000 \text{ m}^2$

26. In an enlargement with scale factor 2, which of the following statements is not true?

- A. Each length is multiplied by 2
- B. Each angle remains the same
- C. The shape of the figure does not change.
- D. The size of the figure does not change.

27. If $w = 12$, $x = 5$, $y = 6$ and $z = 4$, find the value of $wx - yz$.

- A. 18
- B. 27
- C. 36
- D. 84

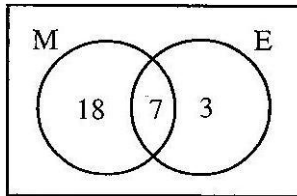
28. What name is given to a triangle which has all its sides equal?

- A. Isosceles triangle

- B. Scalene triangle
 - C. Equilateral triangle
 - D. Right-angle triangle
29. Simplify: $-13 - (-3) + (-10)$
- A. -26
 - B. -20
 - C. -10
 - D. - 6
30. Which of the following best describes the statement: ‘*The locus of a point which moves so that its distance from two fixed points are always equal*’?
- A. Bisector of an angle
 - B. Perpendicular bisector
 - C. Circle
 - D. Two parallel lines
31. The point K (1, 5) is rotated through 90° anti-clockwise about the origin. Find the coordinates of the image of K.
- A. (5, -1)
 - B. (-5, 1)
 - C. (-1, 5)
 - D. (1, -5)
32. If $\begin{pmatrix} 4 \\ 11 \end{pmatrix} = \begin{pmatrix} x - 3 \\ 11 \end{pmatrix}$, find the value of x.
- A. -1
 - B. 1
 - C. 7
 - D. 12
33. Kwame is facing west. Through how many degrees should he turn anti-clockwise to face north?
- A. 90°
 - B. 180°
 - C. 270°
 - D. 360°
34. Given that vectors $\mathbf{u} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, find $2\mathbf{v} - \mathbf{u}$

- A. $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$
 B. $\begin{pmatrix} -1 \\ 1 \end{pmatrix}$
 C. $\begin{pmatrix} -7 \\ -11 \end{pmatrix}$
 D. $\begin{pmatrix} 7 \\ -11 \end{pmatrix}$

The Venn diagram shows the number of pupils who offer Mathematics (M) and / or English in a class.



Use this information to answer Questions 35 and 36.

- 35.** How many pupils offer Mathematics?
 A. 10 B. 18 C. 25 D. 28
- 36.** How many pupils offer only one subject?
 A. 3 B. 7 C. 18 D. 21
- 37.** The point P (5, 4) is reflected in the y-axis. Find its image.
 A. (-5, 4) B. (5, -4) C. (-4, 5) D. (4, -5)
- 38.** The hypotenuse and a side of a right-angled triangle are 13 cm and 5 cm respectively. Find the length of the third side.
 A. 8 cm B. 9 cm C. 12 cm D. 17 cm
- 39.** A hall which is 20 m long is represented on a diagram as 10 cm long. What is the scale of the diagram?
 A. 1:200 B. 1:250 C. 1:400 D. 1:500

END OF OBJECTIVE TEST