

030/2 & 1 AKWAABA MOCK

July 2020

MATHEMATICS 2 & 1

Essay and Objective

2 hours

2&1

Name:.....

Index Number:.....

YOUR STEP ASSESSMENT CONSULT

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AKWAABA MOCK

July 2020

MATHEMATICS 2 & 1

2 hours

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

*The use of calculators is **not** allowed.*

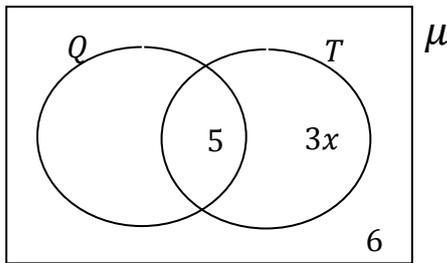
Essay

Answer **four** questions **only**.

All questions carry equal marks.

All working must be clearly shown. Marks will **not** be awarded for correct answers without corresponding working.

1.



- (a) In the Venn diagram above, the number of members in the universal set $n(\mu) = 70$. If $n(Q) = n(T) + 5$, Find
- $n(Q)$
 - $n(T)$
 - $n(Q \cup T)$
 - $n(Q)$ only
 - $n(T)$ only
- (b) If $X = \{\text{prime numbers less than } 29\}$ and $Y = \{\text{odd numbers less than } 29\}$
- List the members of X and Y ;
 - List the members of $X \cap Y$ and $X \cup Y$.
2. (a) A polytank in the form of a cuboid of height 33 cm and a rectangular base of length 11 cm and width 7 cm is filled with water. The water is then poured into a cylindrical container of diameter 7 cm . Calculate the height of the water in cylindrical container. [Take $\pi = 22/7$]
- (b) The average age of a family of 5 is 30 years. The average of the 3 children in the family is 12 years. If the mother is 4 years as young as the father, calculate the age of the father.
- (c) Solve for x in the inequality $\frac{2}{3}(2x + 5) \leq 8\frac{2}{3}$ and illustrate the solution on a number line.
3. (a) Using a ruler and a pair of compasses only.
- Construct a triangle ABC such that $\angle A = 90^\circ$, $\angle B = 60^\circ$ and $\angle C = 30^\circ$.
 - Construct the perpendicular bisectors of AB and BC . Name the intersection of the mediators X .
 - Draw a circle with X as centre and XB as radius.
- (b) Measure
- $\angle A$
 - $\angle B$
 - $\angle C$

4. (a) A trader paid GH¢15.00 for 6 drinking cups, two of the cups got broken. He sold the remaining 4 cups making a profit of 15%. Calculate
- the cost price of each of the six cups;
 - the selling price of each of the 4 cups;
 - the profit made on each cup sold.
- (b) Each of the interior angles of a regular polygon is 140° . How many sides has it?
- (c) Factorize completely $3a^2 + 2ab - 12ac - 8bc$.

5. (a) The table below shows the marks obtained by a number of students in Flagstaff House Basic School in a Mathematics test.

Mark (x)	Frequency (f)	fx
1	2	
2	1	
3	4	12
4	2	
5	6	
6	4	24
7	3	
8	2	
9	4	
10	1	10
Total	$\Sigma f =$	$\Sigma fx =$

- Obtain (prepare) a frequency table for the distribution above.
 - Use the table to find the mean mark and the modal mark.
- (b) If the pass mark is 6, how many students failed the test?
6. (a) Using a scale of $2c\ m$ to 1 unit on both axes, draw two perpendicular axes, OX and OY , on a graph sheet. On the same graph sheet, mark the x - axis from -5 to 5 and y - axis from -6 to 6 .
- (b) Plot the points $A(2, 5)$, $B(2, 2)$ and $C(4, 2)$. Join the points to form a triangle. What type of triangle have you drawn?
- (c) Draw the image $A_1B_1C_1$ of ABC under a reflection in the line $y = 1$ where $A \rightarrow A_1$, $B \rightarrow B_1$ and $C \rightarrow C_1$.

- (d) Draw the image $A_2B_2C_2$ under a clockwise rotation through 270° about the origin O, where $A \rightarrow A_2, B \rightarrow B_2$ and $C \rightarrow C_2$.

END OF ESSAY 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 1

OBJECTIVE TEST

1 hour

Answer all the questions on your Objective Test answer sheet.

1. Use 2B pencil throughout.
2. On the Objective Answer Sheet, write the following details all **correctly**;
Your **surname** followed by **other names**, *Subject Name*, your *Index Number*, *Centre Number* and *Paper Code*.
3. In the boxes marked *Candidate Number*, *Centre Number* and *Paper Code*, shade each of the numbers correspondingly.
4. An example is given below. This is for a candidate whose name is Farouq Sessah Mensah. His *index number* is 0301019033 and he is writing the examination at *Centre Number* 30106. He is offering *Mathematics 1* and the *Paper Code* is 0302.

YOUR STEP ASSESSMENT CONSULT OBJECTIVE ANSWER SHEET

CANDIDATE NAME: MENSAH SESSAH FAROUQ	SUBJECT NAME: MATHEMATICS 1
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1. Use 2B Pencil, Press firmly. 2. Answer each question by choosing one letter and then, shade through the letter chosen like this <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	your first mark completely. 4. If only four alternative answers are given for each question, ignore the letter E. 5. Your question paper may have fewer than 60 questions.
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Answer **all** question.

Each question is followed by four options lettered A to D. Find the **correct** option for **each** question and 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 **each** question. An example is given below

If $m^2 - 1 = 15$, find

- A. $\sqrt{14}$
- B. 4
- C. 14
- D. 16

The correct answer is 4, which is lettered B and therefore answer B space would be shaded.

A B C D

Think carefully before you shade the answer spaces. Erase completely any answer you wish to change.

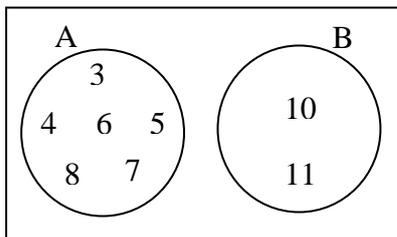
Do all rough work on this question paper.

Now answer the following questions.

1. Find the set of prime factors of 15.

- A. {3}
- B. {1, 3, 5}
- C. {3, 5}
- D. {1, 3, 5, 15}

2. Which of the following describes the relationship between set A and B in the Venn diagram below?



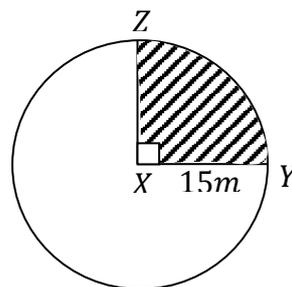
- A. $A \cup B$
- B. $A \cap B = \{7, 10\}$
- C. $A \cap B = \emptyset$
- D. $A \cup B = \{1, 2, 3, 6, 7, 8, 9, 12\}$

3. Mr. Appiah is 40 years old. Mr. Mensah is half as old as Mr. Appiah. Mr. Agyare is 10 years older than Mr. Mensah. How old is Mr. Agyare.

- A. 50 years
- B. 35 years
- C. 30 years
- D. 25 years

4. If $\frac{3}{y} = 2\frac{1}{2}$, find y.

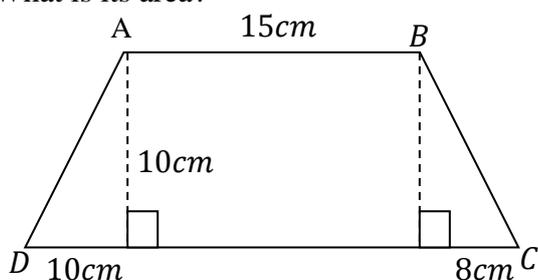
- A. 5
- B. $\frac{5}{2}$
- C. $\frac{6}{5}$
- D. $\frac{8}{3}$



5. In the diagram above, X is the center of the circle with radius 15m. If $\angle YXZ$ is 90° , find the perimeter of the shaded sector. [Take $\pi = 3.14$]

- A. 53.55 m
- B. 23.55 m
- C. 30.00 m
- D. 38.55 m

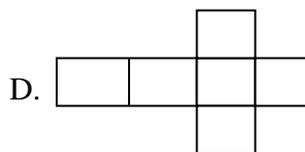
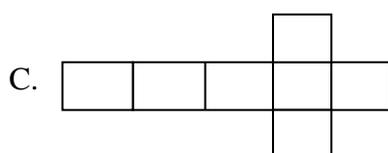
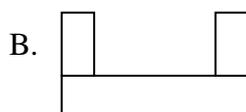
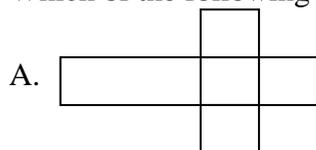
6. $ABCD$ is a trapezium whose height is 10 cm . What is its area?



- A. 165 cm^2
 B. 150 cm^2
 C. 480 cm^2
 D. 240 cm^2
7. How many lines of symmetry has a rhombus?
 A. 2
 B. 3
 C. 4
 D. 5
8. A ribbon is 5 m long. How many pieces, each 30 cm long can be cut out from the ribbon.
 A. 6.0
 B. 15.0
 C. 16.7
 D. 6.7
9. Sarah travelled from Cape Coast to Kumasi. She travelled $\frac{1}{2}$ of the journey by lorry, $\frac{3}{10}$ of the journey by taxi and the rest by foot. What fraction of the journey did she travel by foot?

- A. $\frac{4}{5}$
 B. $\frac{5}{10}$
 C. $\frac{1}{5}$
 D. $\frac{1}{4}$

10. Which of the following is the net of a cube?



11. Convert 120_{ten} to a binary numeral.

- A. 10100
 B. 111000
 C. 11100
 D. 1111000

- Use the mapping below to answer questions 12 and 13.

x	1	2	3	4	5
↓	↓	↓	↓	↓	↓
y	-1	1	3	5	z

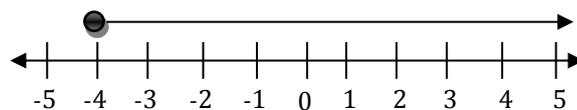
12. What is the rule of the mapping?

- A. $x \rightarrow x(x - 3)$
 B. $x \rightarrow x - 5$
 C. $x \rightarrow 2(x - 2)$
 D. $x \rightarrow 2x - 3$

13. Find z .

- A. -7
 B. 7
 C. 9
 D. 14

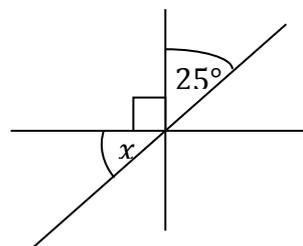
14. Which of the following expressions is illustrated on the number line?



- A. $x < -4$
 B. $x > -4$
 C. $x \leq -4$
 D. $x \geq -4$

15. Find the size of the angle marked x in the diagram.

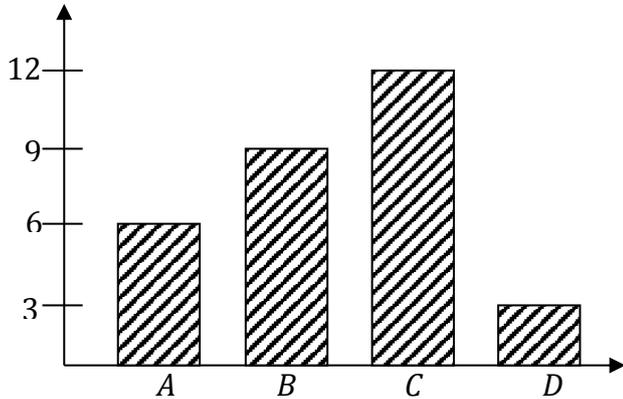
- A. 25°
 B. 65°
 C. 90°
 D. 35°



16. Factorize $x^2 + 7x + 12$

- A. $(x + 3)(x - 4)$
- B. $(x + 3)(x + 4)$
- C. $(x + 2)(x + 5)$
- D. $(x + 4)(x + 8)$

The bar chart shows the distance of 4 villages A, B, C, and D from a market town. Use it to answer questions 17 and 18.



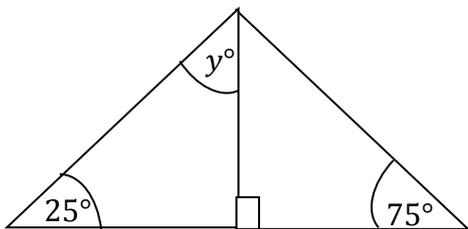
17. Which village is the farthest from the market town?

- A. D
- B. C
- C. B
- D. A

18. How much farther is village C than village A from the market town?

- A. 3 km
- B. 6 km
- C. 9 km
- D. 12 km

19. Find the value of y is the diagram below.



- A. 115°
- B. 65°
- C. 90°
- D. 80°

20. Make x the subject of the relation

$$3x = 2(x + 4y).$$

- A. $x = \frac{8y}{5}$
- B. $x = \frac{4y}{5}$
- C. $x = 8y$
- D. $x = 4y$

21. Find the difference between values of $(3d)^2$ and $3d^2$, when $d = 3$

- A. 27
- B. 54
- C. 81
- D. 0

22. Which of the following dimensions of a triangle forms the side of a right-angle triangle?

- A. 3 cm, 4 cm, 6 cm
- B. 5 cm, 12 cm, 13 cm
- C. 4 cm, 8 cm, 10 cm
- D. 4 cm, 8 cm, 17 cm

23. A point $Q(-3, 4)$ is rotated through an angle of 90° anticlockwise about the origin O . Find the image Q_1 ; of the rotation.

- A. $(4, -3)$
- B. $(4, 3)$
- C. $(-4, -3)$
- D. $(-4, 3)$

24. If $\frac{1}{3}$ is equivalent to $\frac{45}{a}$, find a .

- A. 15
- B. 135
- C. 3
- D. 9

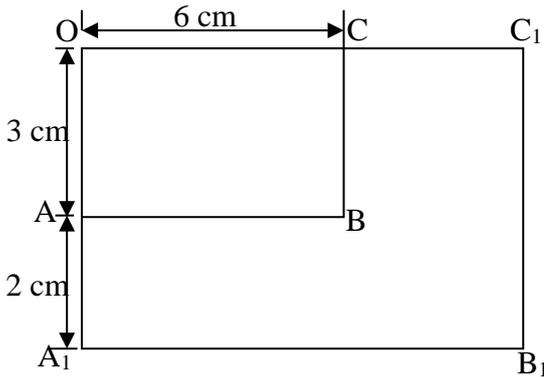
25. Give that vector $a = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ and $b = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$. Find $a + 2b$.

- A. $\begin{pmatrix} 6 \\ 13 \end{pmatrix}$
- B. $\begin{pmatrix} 2 \\ -13 \end{pmatrix}$
- C. $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$
- D. $\begin{pmatrix} 2 \\ -7 \end{pmatrix}$

26. Find the solution set of $x - \frac{3}{4}x \geq \frac{1}{3} + 2x$

- A. $\{x : x \leq -\frac{13}{12}\}$
 B. $\{x : x \geq -\frac{13}{12}\}$
 C. $\{x : x = \frac{13}{12}\}$
 D. $\{x : x < \frac{13}{12}\}$

In the diagram below, rectangle $OABC$ is enlarged into rectangle $OA_1B_1C_1$ from the center O . $OC = 6$ cm, $OA = 3$ cm and $AA_1 = 2$ cm. Use this to answer question 27 and 28.



27. Find the scale factor of the enlargement.

- A. 1.5
 B. 1.6
 C. 1.7
 D. 1.0

28. Calculate OC_1 .

- A. 9.6
 B. 10.2
 C. 9.0
 D. 7.0

29. A bottle of a soft drink cost GH¢ 2.00. The commission paid on one bottle is 2% of the cost price. Find the commission of 48 bottles of soft drink.

- A. GH¢ 1.92
 B. GH¢ 19.20
 C. GH¢ 96.00
 D. GH¢ 19.00

30. Arrange the following fractions in ascending order $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$.

- A. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 B. $\frac{1}{2}, \frac{1}{4}, \frac{1}{3}$
 C. $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$
 D. $\frac{1}{4}, \frac{1}{2}, \frac{1}{3}$

31. A rectangle has an area of 36 cm^2 and a width of 4 cm. Find its perimeter.

- A. 9 cm
 B. 15 cm
 C. 26 cm
 D. 24 cm

32. If $x^2 + 9 = 90$, find x .

- A. 81
 B. 8
 C. 9
 D. 7

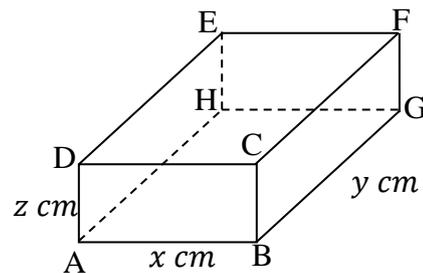
33. Find the highest common factor of 5, 25 and 100.

- A. 5
 B. 25
 C. 100
 D. 12500

34. The value of an obtuse angle lies between

- A. 0° and 90°
 B. 90° and 180°
 C. 90° and 270°
 D. 180° and 360°

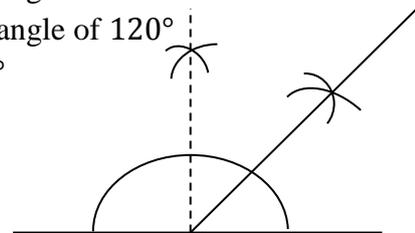
35. The figure below is a cuboid with dimensions x cm by y cm by z cm. Find the area of the face $ABDC$.



- A. $xy \text{ cm}^2$
 B. $x^2 \text{ cm}^2$
 C. $y^2 \text{ cm}^2$
 D. $xz \text{ cm}^2$

36. The construction below shows that one is

- A. constructing an angle of 90°
 B. constructing an angle of 45°
 C. constructing an angle of 120°
 D. constructing 60°



37. Express $\frac{1}{4}$ as a decimal fraction.

- A. 0.25
- B. 0.025
- C. 2.50
- D. 25.00

38. Find the image point $(6, 3)$ is when translated by the vector $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$

- A. $(4, 4)$
- B. $(-4, 4)$
- C. $(4, -4)$
- D. $(-12, 3)$

39. Find the value of $\sqrt[3]{\frac{27}{64}}$

- A. 1.30
- B. 1
- C. 7.50
- D. 0.75

40. If 40% of the pupils in a school is 304. Find the total enrolment in the school.

- A. 7600
- B. 760
- C. 76000
- D. 76

END OF PAPER