MATHEMATICS 2 &1
Essay and Objective
2 hours

2&1

NAME……

INDEX NUMBER …….……

DAS B.E.C.E PERFORMANCE BOOSTER

BASIC EDUCATION CERTIFICATE MOCK

2 hours

MATHEMATICS 2&1

*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, on 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 45 minutes.

The use of calculators is not allowed.

PAPER 2 [60 MARKS] 1HOUR

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.*

PAPER 2: 1 HOUR (60 MARKS)

Answer four questions only

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

1. (a) In a house ¼ speak only Hausa, $\frac{1}{6}$ of the inhabitants speak both Twi and Hausa. If there are 60 inhabitants in the house.
   (i) Illustrate the above in a Venn diagram
   (ii) Find the probability of meeting those who speak Twi in the House
   (b) Given that A and B are subsets of W such that;
   $A = \{\text{Counting forward twos up to } 20\}$
   $B = \{\text{multiples of } 3\}$
   $W = \{0 \leq w \leq 20\}$
   Find (i) $A \cup B$
   (ii) $A \cap B$
   (c) Evaluate $\frac{\mathbf{0.0024 \times 0.0048}}{\mathbf{0.002 \times 0.012}}$ leaving your answer in standard form

2. (a) Given that $p = \frac{\boldsymbol{q-t}}{\boldsymbol{t+1}}$
   i. Make t the subject of the relation
   ii. Find the value of t when $p = \frac{2}{3}$, and $q = \frac{3}{4}$
   (b) Simplify $\left(\frac{1}{4}\right)^2 \times \left(\frac{2}{3}\right)^2 + \left(\frac{1}{5}\right)^2 - \left(\frac{1}{2}\right)^2$
   (c) Given that $A(3, 4)$ and B$(1, 2)$ connect the straight line AB. Find the
   i. gradient of line AB
   ii. equation connecting A and B
3. (a) Using ruler and a pair of compasses only construct a square ABCD with side $8cm$.
   (b) A circular fish pond of diameter 140m is enclosed by a rectangular field measuring 200m by 100m. Calculate the remaining area of the field after the construction of the pond.
   (c) Solve the equation $\frac{\boldsymbol{2t}}{\boldsymbol{5}} = \frac{\boldsymbol{40}}{\boldsymbol{t}}$
4. (a) The interior angle of a polygon is twice the exterior angle. Find the side of the polygon.
   (b) The price of TV set with VAT inclusive is GH₵1200. If the price of the TV set with VAT exclusive is GH₵1000. Find the value of;
   (i) VAT
   (ii) rate of VAT

(c) Given that $X = \binom{3}{4}$, $m = X + 2Y$. Find the value of m if $Y = \binom{1}{6}$

5. (a) If the mean of $x, x+1, x+3, x-2, 2x, x-2$ is 7. Find
   (i) the value of x
   (ii) the set of the data above
   (iii) the median and mode

(b) A trader bought 100 pair of shoes at 4 for GH₵20.00. Ten of the shoes got damaged and she sold the remaining shoes at 3 for GH₵50.00. Calculate the profit or loss of the trader.

(c) A ship sails due East from port A to port B covering 12km. It then sails 5km due North to port C. It finally sails back to port C. Calculate the;

(i) distance between port A and C

(ii) the bearing of C from A

6. (a) Using a scale of 2cm to 1unit on both axes, mark the x-axis $-5 \leq x \leq 5$ and the y-axis; $-5 \geq y \geq 5$

(b) Draw

(i) $x - y = 0$

(ii) $x = 0$

(ii)$x = 4$

(c) label the figure formed, GMP

(d) calculate the area of figure GMP

.

PAPER 1 (OBJECTIVES) 40 MARKS; 1 HOUR

1. Which of the following is the set of prime factors of 12?
A. {2, 3}
B. {1, 2, 3}
C. {1, 2, 4, 6}
D. {2, 3, 4, 6}

2. If P = {2, 3, 5, 7}and Q = {2, 4, 6, 8}, find P∩Q
A. {2}
B. {3}
C. {4}
D. {5}

3. Expand 3a (a – 4b)
A. 3a – 12ab
B. $3a^2$ – 12ab
C. $3a^2$ – 12b
D. $3a^2$ – 12a

4. Express 2700 as a product of prime numbers.
A. $2^2 \times 3^2 \times 5^2$
B. $2 \times 3^3 \times 5^2$
C. $2^2 \times 3^3 \times 5^2$
D. $2 \times 3^2 \times 5^3$

5. The ratio of mangoes to oranges in a basket is 3:2. If there are 36 mangoes, how many oranges are in the basket?
A. 90
B. 60
C. 24
D. 12

6. Express 0.125 as a fraction in its lowest form.
A. 1/8
B. 1/9
C. 1/12
D. 1/16

7. If A = {18, 19, 20} and B = {15, 16, 17}, find A∩B
A. {15, 16, 17, 18, 19, 20}
B. {15, 16, 18, 19}
C. {18, 19}
D. {}

8. An article which costs GH¢ 25.00 was sold for GH¢ 35.00. Find the percentage profit made.
A. 10%
B. 28%
C. 40%
D. 70%

9. 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)

10. Simplify: -13 – (-3) + (-10)
A. -26
B. -20
C. -10
D. – 6

11. Find the HCF of $3^3 \times 5^2$ and $3^2 \times 5^4$
A. $3^2 \times 5^2$
B. $3^3 \times 5^2$
C. $3^2 \times 5^4$
D. $3^5 \times 5^6$

12. Solve the inequality $x - 13 \geq 23 - x$
A. $x \leq 12$
B. $x \leq 23$
C. $x \geq 12$
D. $x \geq 23$

13. Make n the subject of the relation $\theta = 180 - 360n$
A. $(\theta + 180)/2$
B. $(\theta - 180)/2$
C. $(180 - \theta)/360$
D. $(180 + \theta)/360$

14. If $R = h^2 + d^2h$, find R when d = 8 and h = 6.
A. 316
B. 420
C. 434
D. 4916

15. Solve the equation $15(2+y) = 12(y-1)$
A. -14
B. 34
C. 53
D. 3

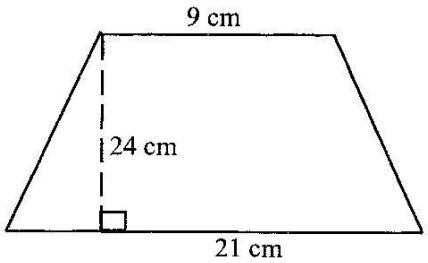
16. The gradient of the straight line that passes through points A(3,2) and B(4,8) is
A. −16
B. −12
C. 2
D. 6

17. A car is travelling at 60 km per hour. How far does it travel in 2 ½ hours?
A. 30 km
B. 60 km
C. 120 km
D. 150 km

18. There are 10 red and 15 green balls in a bag. Find the probability of selecting at random a red ball from the bag.
A. 3/5
B. 2/5
C. 1/10
D. 1/25

19. Kwame and Ama shared an amount of money in the ratio 5:4 respectively. If Kwame had GH¢ 9.00, how much did they share?
A.GH¢ 16.20
B.GH¢ 36.00
C.GH¢ 45.00
D.GH¢ 81.00

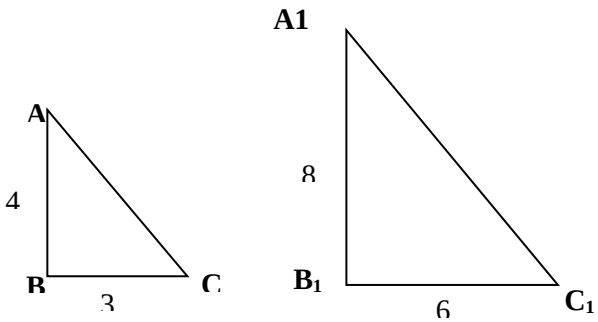
20.



NOT DRAWN TO SCALE

The area of the trapezium above is
A. 120 cm^2
B. 180 cm^2
C. 256 cm^2
D. 360 cm^2

21. In the diagrams below, triangle $A_1B_1C_1$ is an enlargement of triangle ABC. Determine the scale factor.



NOT DRAWN TO

A. 0.50
B. 0.75
C. 2.00
D. 4.00

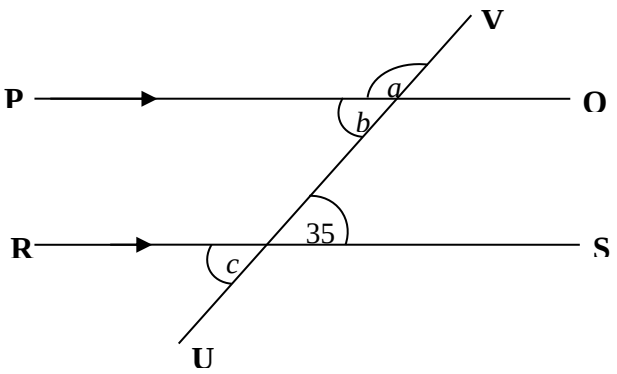
22. Find the least number that must be added to 308 to make it divisible by 19.
A. 4
B. 7
C. 15
D. 18

23. In a school of 940 pupils, the number of girls exceeds the number of boys by 150. How many girls are there in the school?
A. 620
B. 545
C. 470
D. 395

24. Which of the following fractions is equivalent to $\frac{3}{5}$?
A. $\frac{21}{30}$
B. $\frac{12}{20}$
C. $\frac{15}{45}$
D. $\frac{6}{15}$

In the diagram below, line PQ is parallel to RS and UV is a line drawn through PQ and RS.

Use the diagram to answer Questions **25** *and* **26**.



NOT DRAWN TO

25. Find angle *a*.
    A. 35°
    B. 55°
    C. 135°
    D. 145°

26. Angle ***b*** and angle ***c*** are
    A. alternate angles
    B. vertically opposite angles
    C. corresponding angles
    D. interior opposite angles

27. Expand $-x(3-2x)$
    A. $-2x^2 - 3x$
    B. $2x^2 - 3x$
    C. $-2x^2 + 3x$
    D. $2x^2 + 3x$

28. What is the value of 7 in the number 832713?
    A. Seven thousand
    B. Seven hundred
    C. Seventy
    D. Seven

29. Write 3560 in standard form.
    A. 3.56×10^{-4}
    B. 3.56×10^{-3}
    C. 3.56×10^{3}
    D. 3.56×10^{4}

30. Correct 0.02751 to three decimal places
    A. 0.027
    B. 0.028
    C. 0.03
    D. 0.28

31. The bearing of Atoru from Busase is 275^0. What is the bearing of Busase from Atoru?
    A. 180^0
    B. 175^0
    C. 095^0
    D. 075^0

32. In a class of 24 pupils, 10 study French **only** and 8 study English **only**. If **each** pupil studies **at least one** of the two subjects, how many study English?
    A. 12
    B. 14
    C. 16
    D. 18

33. The perimeter of a square is twice the area of the square. Find the length of side of the square
    A. $.8_{cm}$
    B. 4_{cm} .
    C. 2_{cm} .
    D. 3_{cm}

34. Find the volume a cube of side 5 cm.
    A. $10\ cm^3$
    B. $15\ cm^3$.
    C. $25\ cm^3$.
    D. $125\ cm^3$.

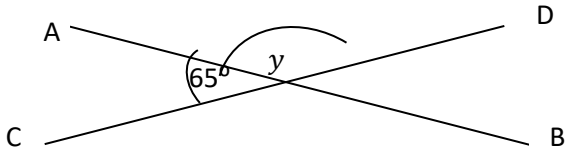
35. The products of three numbers is 420. If two of the numbers are 5and 12. Find the third number
    A. 4
    B. 7
    C. 15
    D. 18

36. The price of a phone with VAT inclusive is GH₵900. If the VAT amount to GH₵150.00. What is the price of the phone with VAT exclusive?
    A. GH₵1000.00
    B. GH₵850.00
    C. GH₵750.00
    D. GH₵900.00

37. The tallest boy in the class is twice taller than the next tallest, the next tallest is twice taller than the third tallest. If the third tallest is xcm. Find expression of the sum of three tallest boys in the class?

A. $8xcm$
B. 9xcm .
C. 10xcm .
D. $7xcm$

38. In the diagram below, **AB** and **CD** are two intersecting straight lines. Find the value of the angle marked y.



NOT DRAWN TO SCALE

A. 130º
B. 115º
C. 65º
D. 60º

39. If points A(2,4) and B(1,1). Find $\overrightarrow{AB}$

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

40. Simplify $2\frac{1}{3}\ of\ \left(2\frac{1}{3} \div 2\frac{1}{3}\right)$

A. $\frac{3}{7}$
B. $\frac{7}{3}$
C. 7
D. .3

MATHEMATICS MARKING SCHEME

PAPER 1

QUESTION 1a

n(U)=60

n(only Hausa) = $\frac{1}{4} \times 60 = 15$

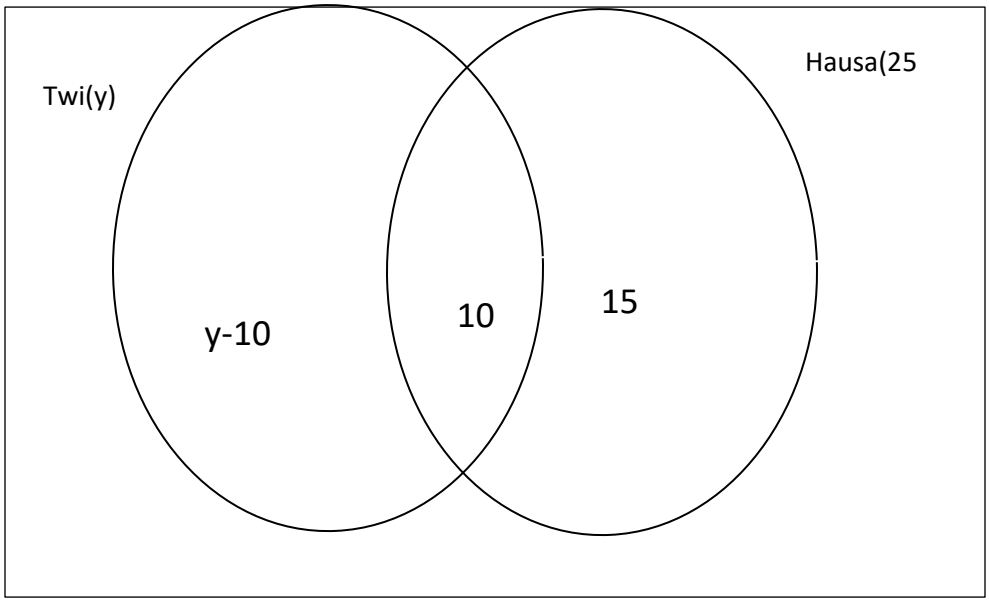
n(both Twi and Hausa) = $\frac{1}{6} \times 60 = 10$

let n(Twi) = y

A1

(i) Venn diagram

n(U)60



(ii) $y - 10 + 10 + 15 = 60$

$y + 15 = 60.$

$y = 60 - 15.$

$y = 45.$

$P(Twi) = \frac{45}{60}.$

$P(Twi) = \frac{3}{4}.$

(b) A ={2, 4, 6, 8, 10, 12, 14, 18, 20} A1

B= {3, 6, 9, 12, 15, 18} A1

W= {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20} A1

(i) AUB ={2,3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20} A1

(ii) A∩B = {6, 12, 18} A1

(c) $\frac{0.0024\times0.0048}{0.002\times0.012}$

$=\frac{24\times10^{-4}\times48\times10-^{4}}{2\times10^{-3}\times12\times10^{-3}}$ M1

$=\frac{24\times48\times10^{-4}\times10-^{4}}{2\times12\times10^{-3}\times10^{-3}}$ B 1

$=\frac{24\times48\times10^{-8}}{2\times12\times10^{-6}}$ M ½

$=48\times10^{-8-(-6)}.$ B ½

$=48\times10^{-2}.$ B ½

$=4.8\times10^{1}\times10^{-2}.$ B ½

$=4.8\times10^{-1}.$ A1 = 5MARKS

QUESTION 2

(a) (i) $p=\frac{q-t}{t+1}.$

$p(t+1)=q-t.$ M ½

$pt+p=q-t.$ B ½

$pt+t=q-p.$

$t(p+1)=q-p.$ B ½

$\frac{t(p+1)}{(p+1)}=\frac{q-p}{p+1}.$ B ½

$t=\frac{q-p}{p+1}.$ A ½ = 2 ½ MARKS

(i)$p=\frac{2}{3},q=\frac{3}{4}$

$t=\frac{\frac{3}{4}-\frac{2}{3}}{\frac{2}{3}+1}.$ M ½

$t = \frac{\frac{9-8}{12}}{\frac{2+3}{3}}$. B ½

$t = \frac{1}{12} \Big/ \frac{5}{12}$. M ½

$t = \frac{1}{12} \times \frac{3}{5}$. B ½

$t = \frac{1}{20}$. A ½ = 2 ½ MARKS

QUESTION 2b.

$\left(\frac{1}{4}\right)^2 \times \left(\frac{2}{3}\right)^2 + \left(\frac{1}{5}\right)^2 - \left(\frac{1}{2}\right)^2$.

$=\frac{1}{16} \times \frac{4}{9} + \frac{1}{25} - \frac{1}{4}$. M1

$=\frac{1}{36} + \frac{1}{25} - \frac{1}{4}$. B1

$=\frac{(50\times1)+(72\times1)-(450\times1)}{1800}$. M1

$=\frac{50+72-450}{1800}$. B1

$=\frac{-328}{1800}$. A1 =5MARKS

QUESTION 2c.

(i)$A(3,4)$, $B(1,2)$.

AB gradient = $\frac{y2-y1}{x2-x1}$ M1

$AB\ gradient = \frac{2-4}{1-3}$. B ½

$AB\ Gradient = \frac{-2}{-2}$. M ½

AB Gradient = 1 A ½ =2 ½ MARKS

(ii)$y - y1 = m(x - x1), A(3,4)$ M ½

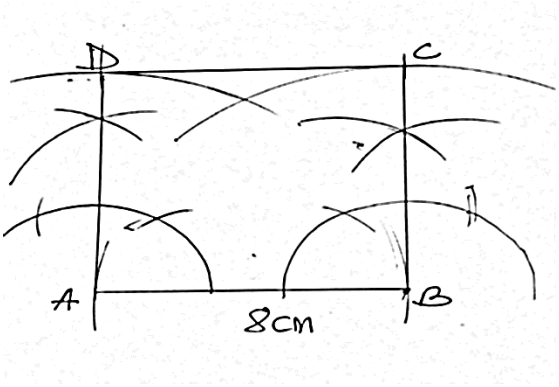
$y - 4 = 1(x - 3)$. B ½

$y = 1(x - 3) + 4$. M ½

$y = x - 3 + 4$. B ½

$y = x + 1.$ A ½ ==2 ½ MARKS

QUESTION 3a.



TOTAL MARKS = 5MARKS

QUESTION 3b.

Radius = 140/2 = 70m

Area of the circular fish pond= πr^2 M ½

Area = $\frac{22}{7} \times 70 \times 70$ M ½

Area = $22 \times 10 \times 70$ B ½

Area = $15400m^2$ A ½

Area of rectangular field = $L \times B$

L = 200m, B = 100m

Area = 200×100 M ½

Area =$20000m^2$ B ½

The area of the remaining field = area of rectangle-area of circle M ½

Remaining area =$20000 - 15400$ B ½

Remaining area = $4600m^2$ A1 TOTAL = =5MARKS

QUESTION 3c

$\frac{2t}{5} = \frac{40}{t}.$

$2t^2 = 5 \times 40.$ M1

$2t^2 = 200.$ B1

$t^2 = 100.$ M1

$t^2 = 10^2.$ B1

$t = 10.$ A1 ==TOTAL 5MARKS

QUESTION 4a

Interior angle = $\frac{(n-2)180}{n}$ M ½

Exterior angle = $\frac{360}{n}$ M ½

$\frac{(n-2)180}{n} = 2(\frac{360}{n})$ M ½

$\frac{180n-360}{n} = \frac{720}{n}.$ B ½

$180n - 360 = 720.$ M ½

$180n = 720 + 360.$ M ½

$180n = 1080.$ B ½

$\frac{180n}{180} = \frac{1080}{180}.$ M ½

$n = 6.$ A 1 = TOTAL ==5MARKS

QUESTION 4b

Price with VAT inclusive = GH₵1200.00

Price with VAT exclusive = GH₵1000.00 M ½

(i) VAT =1200-1000 B1
VAT =GH₵ 200 A1 =TOTAL == 2 ½ MARKS

(ii) Rate of VAT = $\frac{VAT}{Price\ exclusive} \times 100.$ M ½
Rate of VAT = $\frac{200}{1000} \times 100$ B 1
Rate of VAT = 20% A1 = TOTAL ==2 ½ MARKS

QUESTION 4c.

$X = \binom{3}{4}, Y = \binom{1}{6}$

$m = X + 2Y.$ M1

$m = \binom{3}{4} + 2\binom{1}{6}$ B1

$m = \binom{3}{4} + \binom{2}{12}.$ B1

$m = \binom{3+2}{4+12}$. M1

$m = \binom{5}{16}$. A1 = TOTAL == 5MARKS

QUESTION 5

$x, x+1, x+3, x-2, 2x, x-2.$

Mean = 7

$mean = \frac{\sum x}{n}$. M ½

$\frac{x+x+1+x+3+x-2+2x+x-2}{6}$. M 1

$7 \times 6 = 7x + 1 + 3 - 2 - 2.$ B ½

$42 = 7x + 4 - 4.$ M ½

$42 = 7x.$ B ½

$\frac{42}{7} = \frac{7x}{7}$.

$x = 6$ A ½ = TOTAL = 3MARKS

(i) 6, 7, 9, 4, 12, 4 A1

(ii) Median = 4, 4, 6, 7, 9, 12

Median = $\frac{6+7}{2} = 6.5marks$ B ½ A ½

(iii) Mode = 4marks A1

QUESTION 5b

Quantity = 100

Cost = 4 for GH₵20.00

Total cost = $\frac{100}{4} \times 20 = \text{GH₵}500.00$ B ½ A ½

Selling price

Quantity = 100-10 = 90

Selling price = 4 for GH₵50.00

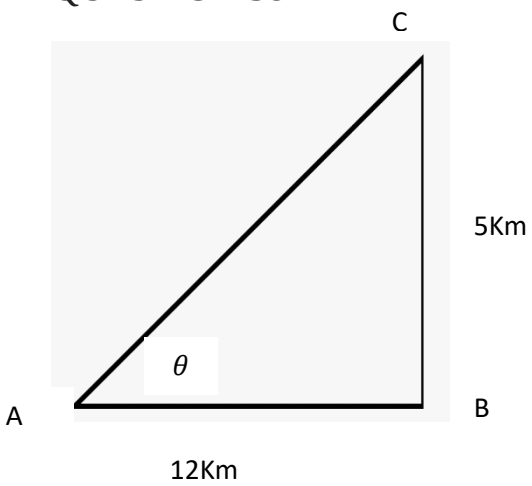
Total sales/selling price = $\frac{90}{3} \times 50 = \text{GH₵}1500.00$ M ½ A ½

Profit = total selling price -total cost B ½

Profit = 1500-500 M ½

Profit = GH₵1000.00 A 1 = TOTAL = 4MARKS

QUESTION 5c



M ½

(i)$|AC|^2 = |AB|^2 + |BC|^2$. M ½

$|AC|^2 = 12^2 + 5^2$. B ½

$|AC|^2 = 144 + 25$. M ½

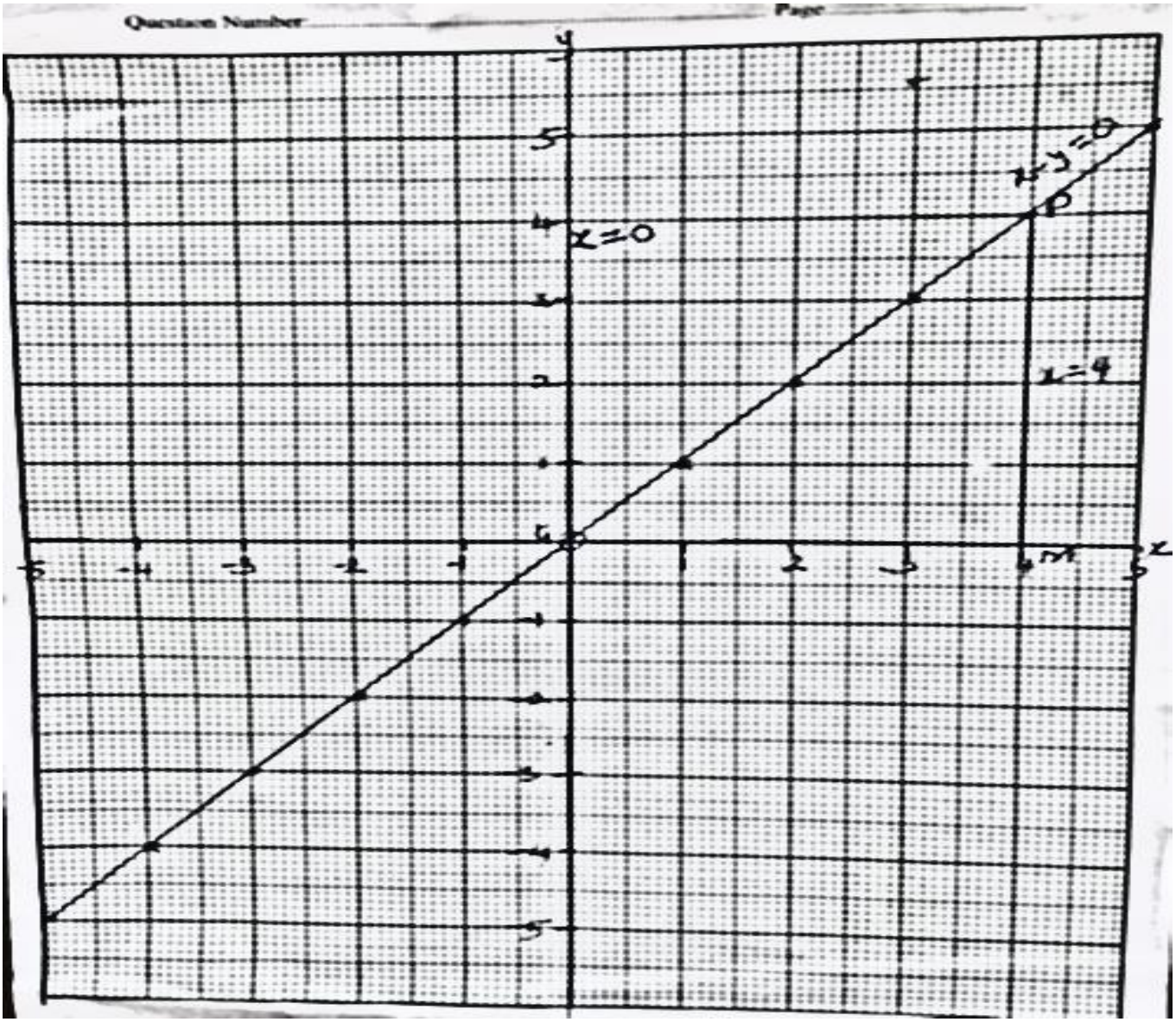
$|AC|^2 = 169$. B ½

$|AC|^2 = 13^2$. M ½

$|AC| = 13km$. A1

(ii)$tan\theta = \frac{12}{5}$ A1 =5MARKS

QUESTION 6



(d) GM = base = 8cm, height = 8.5cm

Area = $\frac{1}{2} \times base \times height$

$Area = \frac{1}{2} \times 8 \times 8.5.$

$Area = \frac{1}{2} \times 68.$

Area = $34cm^2$

PAPER 1

1. A
2. A
3. B
4. C
5. C
6. A

7. D
8. C
9. B
10. B
11. A
12. C
13. C
14. B
15. A
16. D
17. D
18. B
19. A
20. D
21. C
22. C
23. B
24. B
25. D
26. C
27. B
28. B
29. C
30. C
31. C
32. B
33. C
34. D
35. B
36. B
37. D
38. B
39. C
40. B

DAS Mock
MATHEMATICS 2 & 1
Essay and Objective
2 hours

2&1

NAME……

INDEX NUMBER ……..……....

DAS B.E.C.E PERFORMANCE BOOSTER

BASIC EDUCATION CERTIFICATE MOCK

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MATHEMATICS 2&1

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PAPER 2 [60 MARKS] 1HOUR

Essay

Answer four questions only

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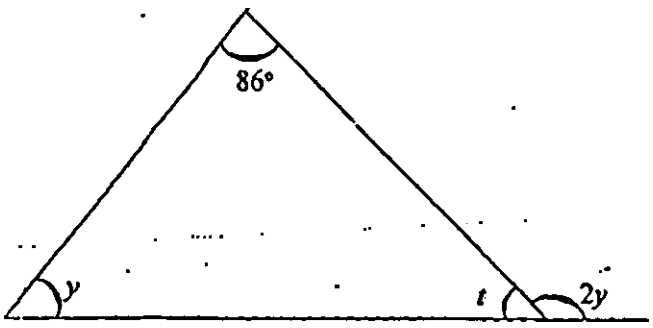
1. *(a)* Simplify: $\frac{\mathbf{32^{-2}\times16^{-2}\times2^{-3}}}{\mathbf{64^{-1}\times4^{-2}}}$, leaving the answer in index form.

(b) If $\begin{pmatrix}-10\\12\end{pmatrix} = \begin{pmatrix}2x-2\\-y-3\end{pmatrix} + \begin{pmatrix}x\\-2y\end{pmatrix}$, find the values of *x* and y

(c



NOT DRAWN TO

Using the diagram, find the value of:

(i) t;

(ii) $(t + y)$

2. (a) Given that $y - y_1 = m(x - x_1)$, find the equation connect $A(3,4)$ and $B(5,8)$ to form a line

(b) Solve $7\frac{2}{5} - \frac{3}{10}x \geq 6 - \frac{1}{5}x$. Illustrate the answer on a number line.

(c) Find the principal amount that will be invested to yield an amount of GH₵12,000 at 10% for 2years

(d) Factorize completely $(x - 1)(x + 2) + 3(x - 1)$

3. (a) Make **h** the subject in $A = 2\pi r^2 + 2\pi rh$

(b)(i) Using a ruler and a pair of compasses only, construct triangle PQR such that, $|PQ| = |QR| = 9cm$ and $< PQR = 45°$

(ii) Construct a line at $|PQ|$such that $|PM|: |MQ| = 1:1$

(iii) Construct the mediator of $|QR|$

(iv) Locate the intersection of the line in (ii) and mediator in (iii) O. With radius $|OR|$,construct a locus such that it is equal distance from the point O.

(v) Measure angle $< RPQ$,what type of triangle is PQR

4. (a Using a scale of 2cm to 2 units on both axis

a. Mark the x-axis $-10 \leq x \leq 10$ and y-axis $-12 \leq y \leq 12$

b. Plot on the same graph sheet the vectors $\boldsymbol{A(2,4), B(10,2)}$ $\boldsymbol{and}$ $\boldsymbol{C(4,10)}$ using cartesian components. Join the coordinates of ABC. What figure is that?

c. Draw on the same graph paper images of vectors $\boldsymbol{A_1(-2,-4), B_1(-10,-2)}$ $\boldsymbol{and}$ $\boldsymbol{C_1(-4,-10)}$ using cartesian components. Join $A_1B_1C_1$.

d. Draw on the same graph sheet the images of vectors $\boldsymbol{A_2(-4,2), B_2(-2,10)}$ $\boldsymbol{and}$ $\boldsymbol{C_2(-10,4)}$ using cartesian components. Join $A_2B_2B_2$

e. What single transformation maps ABC unto?

(i) $\boldsymbol{A_1B_1C_1}$

(ii) $\boldsymbol{A_2B_2B_2}$

5. (a) Thirty-five men can dig a well in 28 days. How many days will 14 men take to dig the well, working at the same rate?

(b) The external angles of a polygon are 30°, 40°, 120°, 142° and y°. Find the value of y.

(c) Mr. Yeboah shared some money among his three children. The first child received $\frac{1}{2}$, the second $\frac{1}{4}$ and the third $\frac{1}{6}$ of it.

(i) What fraction of the money was left?

(ii) If the remaining money was GH₵ 2,400.00, how much money was shared?

6. (a) The volume of a cylindrical tin is 1,540 cm^3 . If the height of the cylinder is 10 cm, find its radius. [Take $\pi = \frac{22}{7}$]

(b) The table shows the distribution of goals scored by a school soccer team in a competition.

Grades	A	B	C	D	E	F
FREQUENCY	100	80	120	90	130	200

(i) Calculate the mean grade

(ii) Find the modal grade.

(iii)Draw a pie chart to represent the information.

(iv)If the passed grade is at most grade D, find the probability of obtaining a pass grade.

Answer **all** *questions.*

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

1. Given that $U = \{2, 3\}$, how many subsets has U?
A. 1
B. 2
C. 3 .
D. 4

2. Simplify: $a^2 \div a^4 \times a^2$.
A. a^8
B. a^4
C. 0
D. 1

3. Which of the following statements is **true?**
A. 8+ 4 < 10
B. 7 + 4 < 10
C. 6 + 4<10
D. 5 + 4 < 10

4. Express $\frac{4}{100}$ as a decimal fraction.
A. 0.4
B. 0.04
C. 0.004
D. 0.0004

5. Expand: $(2x + y)(2x - y)$.
A. $4x^2 + y^2$
B. $4x^2 - y^2$
C. $4x^2 + xy - y^2$
D. $4x^2 - xy - y^2$

6. A dozen eggs costs GH¢ 4.80. Find the cost of 16 eggs.
A. GH¢ 6.00
B. GH¢ 6.40
C. GH¢7.20
D. GH¢ 8.00

7. Simplify: $-25 - (-5) + (-20)$.
A. -40
B. -20
C. 7
D. 40

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

9. 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. $\frac{1}{8}, \frac{1}{2}, \frac{2}{5}, \frac{2}{3}$

C. $\frac{3}{4}, \frac{1}{2}, \frac{2}{5}, \frac{1}{8}$

D. $\frac{1}{2}, \frac{1}{8}, \frac{2}{5}, \frac{3}{4}$

10. Simplify: $(x + 3) - 2(4 + x) + 5x - 4$.

A. $8x - 9$

B. $5x - 9$

C. $-2x - 9$

D. $4x - 9$

11. If the circumference of a circular tank is 44m, find its diameter. [Take $\pi = \frac{22}{7}$]

A. 4.9m

B. 7.0m

C. 14.0m

D. 28.0m

12. 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. $\begin{pmatrix} -1 \\ -5 \end{pmatrix}$

13. Factorize: $3x^2 - 2x + 6x - 4$.

A. $(x - 1)(3 - t + 4)$

B. $(x + 1)(3x - 4)$

C. $(3x - 2)(x + 2)$

D. $(3x + 2)(x - 2)$

14. Find the **highest** common factor of 63 and 81.

A. 6

B. 7

C. 9

D. 21

15. 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

16. The ratio of girls to boys in a school is 4 : 6. If there are 200 pupils in the school, how many boys are there?

A. 80

B. 90

C. 100

D. 120

17. Make m the subject of the relation $A = \frac{1}{2}(m + n)h$

A. $m = \frac{2A}{h} - n$

B. $m = 2A - hn$

C. $m = 2A + hn$

D. $m = \frac{2A}{h} + n$

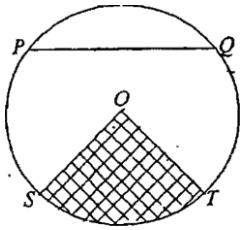
18. If the area of a square is 64 cm , find its perimeter.

A. 8cm
B. 16 m
C. 24 cm
D. 32 cm

19. Find the simple interest on GH¢ 280.00 at 3 % per annum for 6 months

A. GH¢ 4.20
B. GH¢ 8.40
C. GH¢ 10.50
D. GH£ 25.20

The diagram shows the points *P,Q, S*and T on a circle with centre *O.*



Use the information to answer questions 20 *and* 21.

20. The line *PQ* is

A. a radius.
B. a diameter
C. a chord.
D. an arc.

21. The shaded region

A. triangle.
B. semicircle.
C. segment
D. sector

22. Simplify: $(3m)^2 - 3m^2$

A. $3m$

B. $3m^2$

C. $6m$

D. $6m^2$

23. A trader sold a television set for GH¢ 300.00 and made a profit of 20 %. Find the cost price of the television set.

A. GH¢ 280.00
B. GH¢ 260.00

C. GH¢ 250.00
D. GH¢ 240.00

x	1	2	3	4
↓	↓	↓	↓	↓
y	3	5	7	9

Use the mapping to answer questions **24** *and* **25.**

24. What is the rule for the mapping?
A. $x \to 4 - x$
B. $x \to x - 2$
C. $x \to 2x$
D. $x \to 2x + 1$

25. What is the value of y when x is **7?**
A. 15
B. 14
C. 9
D. 3

26. A car travels at a speed of 45 km/h. What distance does it cover in 12 hours?
A. 540km
B. 480km
C. 500km
D. 580km

The marks obtained by 9 students in a test are : 6, 3, 4, 7, 3,7, 8, 5, 7. Use the *information to answer questions* **27, 28** and **29.**

27. Find the median.
A. 4
B. 5
C. 6
D. 7

28. Calculate to two decimal places, the mean mark.
A. 5.55
B. 5.56
C. 6.66
D. 6.67

29. Find the modal mark.
A. 3
B. 4
C. 6
D. 7

30. If $b = 2p^2(p - 3) \div 7p$, find b when $p = 10$.
A. 4
B. 20
C. 29
D. 40

31. If A = {2, 4, 6, 8} and B = {1, 3, 5, 7, 9}, find ,$A \cap B$

A. {1,2,3,4,5,6:7,8,9}
B. {3,4,5,6,7}
C. {1,2,3}
D. { }

32. Express 0.75 as a fraction in its **lowest** form.

A. $\frac{3}{5}$
B. $\frac{4}{3}$
C. $\frac{5}{3}$
D. $\frac{3}{4}$

33. The point p(x, y), under the translation vector $\binom{3}{7}$has an image $p'(6,\ 8)$. Find the coordinates of p.

A. (9, 15)
B. (3, 1)
C. $(-3, -1)$
D. $(-9, -15)$

34. If $3^{2a} = 27$ find the value of a.

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

35. The sum of the interior angles of a regular polygon with 7 sides is

A. 260°.
B. 700°.
C. 800°.
D. 900°.

36. If $27 : 4x = 9 : 16$, find the value of x**.**

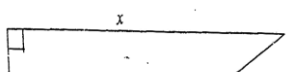
A. 6
B. 8
C. 12
D. 16

37. Find the value of $5 + 2° - 1$.

A. 3
B. 4
C. 5
D. 6

38. A box contains 6 green and 5 yellow balls. What is the probability of pickng a green ball?

A. $\frac{1}{6}$
B. $\frac{6}{11}$
C. $\frac{1}{5}$



D. $\frac{5}{11}$

39. Find the value of x in the diagram

A. 14cm
B. 16cm
C. 19cm
D. 27cm

40. If P={11, 14, 18, 19} and Q={11, 13, 15, 17}, find the sum, of all the members in P which are not in Q.

A. 45
B. 51
C. 56
D. 62

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MATHEMATICS MARKING SCHEME

PAPER 2

QUESTIONS 1 5marks

a. $\frac{32^{-2} \times 16^{-2} \times 2^{-3}}{64^{-1} \times 4^{-2}}$

$\frac{2^{5\times(-2)} \times 2^{4(-2)} \times 2^{-3}}{2^{6 \times (-1)} \times 2^{2(-2)}}$ M1

$\frac{2^{-10} \times 2^{-8} \times 2^{-3}}{2^{-6} \times 2^{-4}}$ B1

$\frac{2^{-10+(-8)+(-3)}}{2^{-6+(-4)}}$ M$^{1}/_{2}$

$\frac{2^{-21}}{2^{-10}}$ M $^{1}/_{2}$

$2^{-21-(-10)}$ M $^{1}/_{2}$

2^{-21+10} M $^{1}/_{2}$

2-11 A 1 =5MARKS

QUESTION 1b 5marks

$\begin{pmatrix} -10 \\ 12 \end{pmatrix} = \begin{pmatrix} 2x-2 \\ -y-3 \end{pmatrix} + \begin{pmatrix} x \\ -2y \end{pmatrix}$.

$-10 = 2x - 2 + x$ M ½

$-10 + 2 = 2x + x$ B ½

$-8 = 3x$ B ½

$-\frac{8}{3} = \frac{3x}{3}$ M ½

$= x = \frac{-8}{3} = 2\frac{2}{3}$ A ½ =2 ½ marks

$12 = -y - 3 + (-2y)$ B ½

$12+3 = -y - 2y$ B ½

$15 = -3y$ M ½

$= \frac{15}{-3} = y$ M ½

$= y = -5$ A ½= 2 ½ marks

QUESTION 1c 5marks

(i) $y + 86 = 2y$ M ½

$86 = 2y - y$ B ½

$86° = y$ A ½=1 ½ marks

But $t + 86 + y = 180$

$t+86 + 86 = 180$ M ½

$t+172 = 180$ M ½

$t = 180 - 172$

$t = 8°$ A ½=1 ½ marks

(ii) $(t + y) = 8 + 86 = 94°$ M1,A 1=2marks

QUESTION 2

a. $y - y1 = m(x - x1)$

A(3,4) B(5,8)

Gradient (m)$= \frac{y2-y1}{x2-x1}$ M ½

Gradient (m)$= \frac{8-4}{5-3} = \frac{4}{2} = 2$ A ½

$y-4 = 2(x - 3)$ M ½

$y = 2(x - 3) + 4$ M ½

$y = 2x - 6 + 4,$

$y = 2x - 2x - 2$ A ½ =2 ½ marks

b. $7\frac{2}{5} - \frac{3}{10}x \geq 6\frac{1}{5}x$

$= \frac{37}{5} - \frac{3}{10}x \geq 6 - \frac{1}{5}x$ B ½

$=10 \times \frac{37}{5} - \frac{3}{10}x \times 10 \geq 6 \times 10 - \frac{1}{5}x \times 10$ M ½

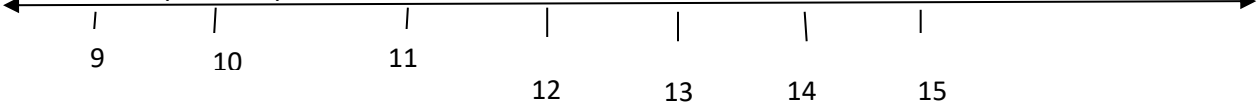
$=2(37) - 3x \geq 60 - 2x$ M ½

$=74 - 3x \geq 60 - 2x$ M ½

$=74 - 60 \geq -2x + 3x$ M ½

$=14 \geq x\ ; x \leq 14$ $\{x \leq 14\}$ A ½

Number line (2marks)



c. Total amount = Ghc 12000 Rate(r) = 10%

Time (t) = 2years

A = P+T B ½

A= P+$\frac{PRT}{100}$ B ½

1200= $P + \frac{P \times 10 \times 2}{100}$ M ½

1200= $P + \frac{20P}{100}$ M 1

1200= $P + \frac{P}{5}$ M ½

5(12000)= $5P + \frac{P}{5} \times 5$ B 1

60000= $5P + P$

P=$GHC10{,}000$ A 1=5marks

d. $(x-1)(x+2) + 3(x-1)$

$(x-1)(x+2) + 3$ B1

$(x-1)(x+2+3)$ M1

$(x-1)(x+5)$ A ½ =2 ½ Marks

QUESTION 3

a. .

A=$2\pi r^2 + 2\pi r$h

A$-2\pi r^2 = 2\pi rh$ M ½

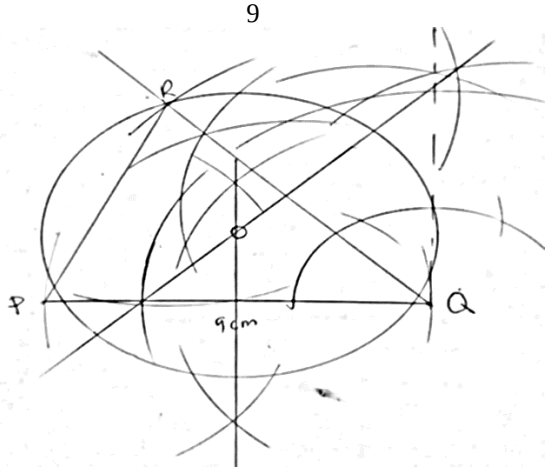
=$\frac{A-2\pi r}{2\pi r} = \frac{2\pi rh}{2\pi r}$ M ½

h= $\frac{A-2\pi r}{2\pi r}$ A1=2Marks

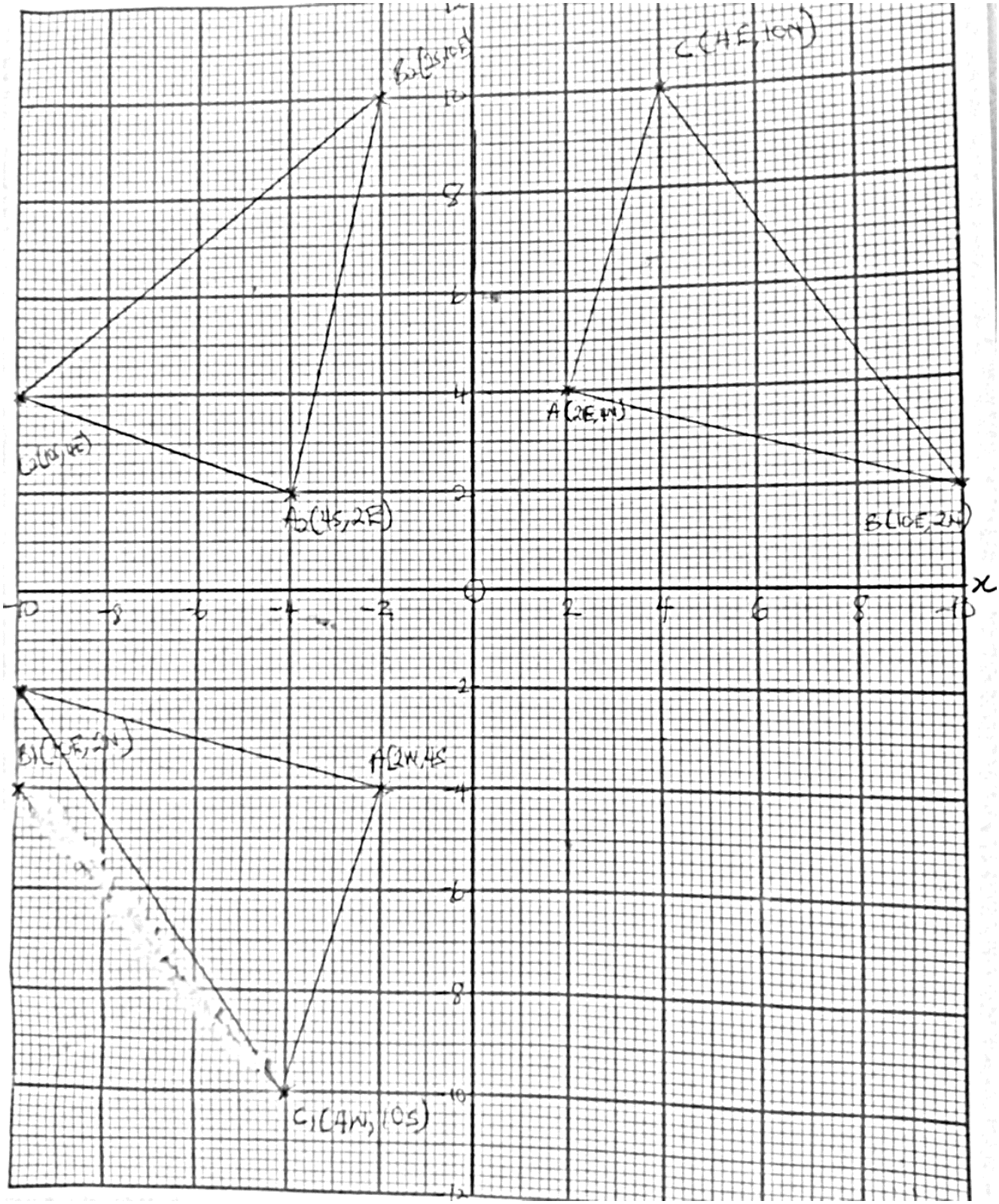
QUESTION 3b

Construct =10marks

Angle correct= 2marks



Question 4


C(4E, 10N)
A(2E, N)
B(10E, 2N)
A₂(4S, 2E)
C(0E, 4E)
A(2N, 4S)
C₁(4W, 10S)
x

Notes;

1. Each coordinate plot and join= ½ marks=9marks +1=10marks(3 triangles)
2. X-axis scale and labelling =1mark each=2marks

(e)

(i) Rotation about half-turn or 180° about the origin A 1 ½

(ii) Anti-clock wise rotation 90°/270° about the origin A1 ½ =3Marks
Total =13marks

QUESTION 5

a.

5 men = 28 days

14 men = $\frac{28\times5}{14}$ days M1

= 5 x 2 B1

= 10 days

The number of days = 10 A1=3Marks

b.

Sum of exterior angle of a polygon = 360

The angles; 30, 40, 120, 142, and y

30+40+120+142+y = 360 B1

332 + y = 360

y = 360 – 332 M1

y=28° A1=3marks

c.

1st = $\frac{1}{2}$, second = $\frac{1}{4}$,, third = $\frac{1}{6}$,

i. =Fraction left = 1- fraction spent

= 1- $[\frac{1}{2}+\frac{1}{4}+\frac{1}{6}]$ B1

= 1 – [$\frac{6\times1\times3\times1\times2\times1}{12}$ M1

= 1 - $\frac{6+3+2}{12}$

= 1 - $\frac{11}{12} = \frac{12-11}{12} = \frac{1}{12}$ A1=3marks

ii. Money left =GH ₵2400, let Total money = x

Total fraction = total money

Fraction left = money left

1 = x

$\frac{1}{12} = 2400.$ B1

2400= $\frac{1}{12}x$ M1

$12 \times 2400 = x.$

$x = Ghc28800.$ A1=3marks

QUESTION 6

a) Volume = 1540cm^3

Volume = πr^2h, h= 10cm

$1540 \times 7 = 22 \times 10 \times r^2$ B 1

=$\frac{1540\times7}{22\times10} = \frac{22\times10\times r}{22\times10}$ M ½

$7 \times 7 = r^2$ M 1

$7^2 = r^2$ A 1=3marks

$=7cm = r$

Radius = 7cm

b)

i. Mean= $\frac{total}{n}$ B 1

mean= $\frac{100+80+120+90+130+200}{6}$ M 1

mean= $\frac{720}{6} = 120$ A 1=3marks

ii. Modal grade is F A2 =2Marks

iii. Pie chart

Total =720

A $\frac{100}{720} \times 360 = 50°$

B. $\frac{80}{720} \times 360 = 40°$

C. $\frac{120}{720} \times 360 = 60°$

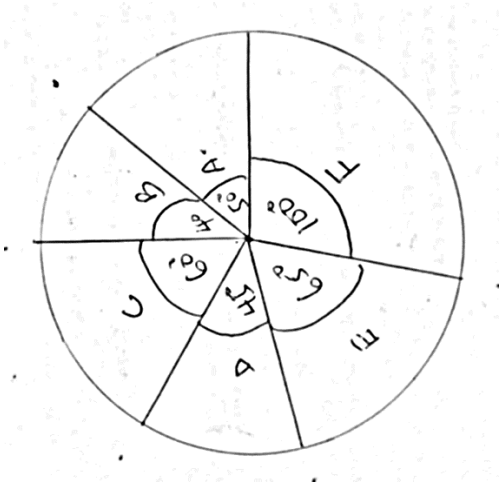
D. $\frac{90}{720} \times 360 = 45°$

E. $\frac{130}{720} \times 360 = 65°$

F. $\frac{200}{720} \times 360 = 100°$

pie chart = A ½ each= 1 ½ marks

Pie chart diagram= 3 ½ marks= 5marks



iv. Pass = 100+80+120+90 = 390

P(pass) $= \frac{390}{720} = \frac{39}{72}$ A2 marks

PAPER 1[40MARKS]

1. D
2. D
3. D
4. B
5. B
6. B
7. A
8. C
9. A
10. D
11. B
12. D
13. C
14. C
15. A
16. D
17. A
18. D
19. A
20. C
21. D
22. D
23. C
24. D
25. D
26. A
27. C
28. B
29. D
30. B
31. D
32. D
33. B
34. B
35. D
36. C
37. C
38. B
39. B
40. B

BECE BOOSTER
MATHEMATICS
Essay and Objective
2 hours

Name: ……

2&1

Index number: ……

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BASIC EDUCATION CERTIFICATE MOCK

MATHEMATICS

2 hours

[100 marks]

*Write your **name** and **index number** in **ink** in the spaces provided above*

This booklet consists of two papers. Paper 2 and paper 1. Answer four questions in paper 2.

Answer paper 2 on the question paper.

Paper 2 will last 1 hour after which the answer booklet will be collected

Answer paper 1 on your objective test answer sheet

Do not start paper 1 until you are told to do so. Paper 1 will last 1 hour

PAPER 2: 1 HOUR (60 MARKS)

Answer four questions only

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

4. (a) Evaluate $\left(3\frac{1}{2}+\frac{1}{4}-\frac{1}{8}\right)\div 2\frac{1}{4}$

(b) Amma spent $\frac{1}{4}$ of her pocket money on food, $\frac{1}{6}$ of the remaining money on sweets, $\frac{1}{5}$ of what still remained on classes. If she was still left with $GH¢10.50$, calculate her pocket money.

(c) If $m=\binom{2x-3}{3-3y}$, $n=\binom{4-x}{y+2}$ and $m+2n=\binom{5}{4}$, find the values of x and y

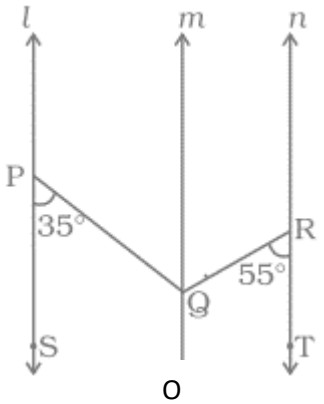
5. (a) Given that $S_n=\frac{n}{2}[a+(n-1)d]$

iii. Find the value of S_n if $a=3, n=10$ and $d=2$

iv. Express d in terms of S_n, n and a

(b) In the diagram below, lines LS, MO and NT are parallel lines ∠ QPS = 35° and ∠ QRT = 55°.

Find ∠PQR



(c) A shop owner allowed a discount of 10% on the price of an item. If the new price of the item is GH¢90.00. Find the original price of the item

3. (a) Factorize completely $4x^2-9y^2$

(b) Using a ruler and a pair of compasses only, construct triangle XYZ, such that |XY| = 6cm

| XZ| =8cm and | YZ| =10cm.

i. Construct the mediator of line YZ

ii. Construct the mediator of line XZ

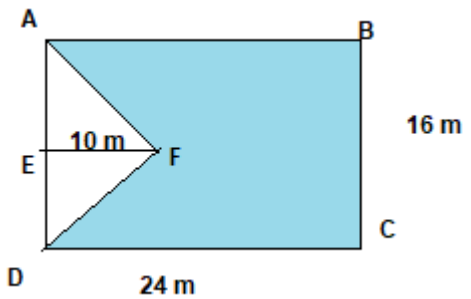
iii. Locate O the point of intersection of the mediators of lines YZ and XZ with centre O and radius OY, draw a circle

4. The table below shows school items at Kojokrom JHS bookshop.

School items	***Quantity***	***Price***
Pens	20	GH₵10.00
Books	30	GH₵9.00
School bags	15	GH₵30.00
School uniforms	18	GH₵20.00
Textbooks	35	GH₵4.00
Mathematical sets	4	GH₵5.00

a) Calculate the sales of each of the items, hence the total sales of all the school items at the bookshop.
b) Find the mean sales of the school items
c) Draw a pie chart to illustrate the sales of the school items at the bookshop
d) Find the percentage of Mathematical sets sales at the bookshop

5. (a) ABCD is a rectangle with dimensions 24m by 16m. AFE is a triangle such that EF = 10m. Calculate the area of the shaded portion.



(b) Solve for x in $\frac{2}{x} - 2 = \frac{3}{2x} + 3$

(c) In a class, 80 students speak either Twi or Gas. Forty percent of the class speak Twi, sixty percent speak Ga and ten percent of the class speak both Ga and Twi. Find the number of students who do not speak Twi nor Ga.

6(a) Kofi, Amma and Yaw received GH₵2700.00 to share in the ratio 2:3:x. if Yaw had GH₵900.00

i. Find the value of x
ii. Find the share of Kofi and Amma

(b) A man took a loan of GH₵24000 from a bank at $2\frac{1}{2}\%$ per annum for 5 years.

i. Calculate the total amount he will pay to the bank the end of the 5 years
ii. Find his yearly installment

PAPER 1 (OBJECTIVES) 40 MARKS; 1 HOUR

1) If U ={x, y, z} and v ={z, y, x}.
What is the relationship between U and V?
   A. U and V are equal sets
   B. U and V are disjoint set
   C. U and V are Union sets
   D. U and V are intersection set
2) A set with three members will have how many subsets?
   A. 6
   B. 8
   C. 10
   D. 4
3) Write 225 as a product of prime factors
   A. $5^2 \times 3^2$
   B. 5x2
   C. 5^2x2^2
   D. 5^3
4) Simplify $(5m + 3n) - (2m - n)$
   A. $5m - 4n$
   B. $3m + 4n$
   C. $3m - 2n$
   D. $7m + 4n$
5) The sum of 5 and x divided by 4 is equal to 3.5. find the value of x
   A. 8
   B. 9
   C. 2 ¼
   D. $3\frac{4}{13}$
6) The ratio of mangoes to oranges in a basket is 3:2. If there are 36 mangoes, how many oranges are there in the basket?
   A. 90
   B. 60
   C. 24
   D. 12
7) Express 0.125 as fraction in its lowest term
   A. $\frac{1}{8}$
   B. $\frac{1}{9}$
   C. $\frac{1}{12}$
   D. $\frac{1}{16}$
8) Convert 29.5439 into 2 significant figure
   A. 30
   B. 31
   C. 29
   D. 62
9) Find the HCF of 3^3x5^2 and 3^2x5^4
   A. $3^2 \times 5^2$
   B. $3^3 \times 5$
   C. $3.\times 5^2$
   D. $3^2 \times 5^3$

10) Find the area of a square whose perimeter is 28cm
   A. 784cm^2
   B. 196cm^2
   C. 49cm^2
   D. 14cm^2
11) Simplify $\frac{1}{3}[\frac{1}{2} - \frac{1}{3}] - \frac{1}{3}[\frac{1}{3} - \frac{1}{2}]$
   A. $-\frac{1}{9}$
   B. $-\frac{1}{18}$
   C. $\frac{1}{18}$
   D. $\frac{1}{9}$
12) If $R = \frac{h}{2} + \frac{d^2}{8h}$. find R when $d = 8$ and $h = 6$
   A. $3\frac{1}{6}$
   B. $4\frac{1}{3}$
   C. $4\frac{3}{4}$
   D. $4\frac{9}{16}$
13) The gradient of straight the line that passes through points A(3,2) and B(4,8) is---
   A. $-\frac{1}{16}$
   B. $-\frac{1}{2}$.
   C. 2
   D. 6

14) A car is travelling at 60km per hour. How far does it travel in $2\frac{1}{2}$hours?
A. 30km
B. 60km
C. 120km
D. 150km

15. A box contains 30 identical balls of which 16 are red and the rest yellow. If a girl picks a ball at random from the box, what is the probability that it is a yellow ball?
$A.\ \frac{1}{16}$.
B. $\frac{7}{15}$.
$C.\ \frac{8}{15}$.
$D.\ \frac{7}{8}$.

16. Simplify $\frac{3x}{4} - \frac{x-y}{3}$
$A.\ \frac{5x-4y}{12}$.
B. $\frac{13x-4y}{12}$
C. $\frac{5x+4y}{12}$
D. $\frac{13x+4y}{12}$

17. Find the volume of a cylinder of height 3cm and radius 2cm
A. $6\pi cm^3$
B. $12\pi cm^3$
C. $18\pi cm^3$
D. $24\pi cm^3$

18. Given that r=$\begin{pmatrix}-3\\4\end{pmatrix}$ and s=$\begin{pmatrix}1\\-3\end{pmatrix}$. Find $r - 2s$
$A.\ \begin{pmatrix}-5\\1\end{pmatrix}$.
B. $\begin{pmatrix}-5\\10\end{pmatrix}$
C. $\begin{pmatrix}-2\\10\end{pmatrix}$
D. $\begin{pmatrix}-1\\10\end{pmatrix}$

19. Which of the following fractions is equivalent to $\frac{3}{5}$
A. $\frac{21}{30}$
B. $\frac{12}{20}$
C. $\frac{15}{45}$
D. $\frac{6}{15}$

20. Calculate the simple interest on GH¢ 450.00 for 2 years at 12%
A. Gh¢ 191.00
B. Gh¢ 108.00
C. Gh¢ 54.00
D. Gh¢ 27.00

21. If $x = 5$ and $2x + y = 8$. Find $x + y$
A. -5
B. 6
C. 3
D. 10

22. The opposite and adjacent of a right angle triangle are 5cm and 12cm respectively. Find the length of the diagonals
A. 13cm
B. 6cm
C. 8cm
D. 15cm

23. If vector $\overrightarrow{AB}$= $\begin{pmatrix}3\\4\end{pmatrix}$. What is vector $\overrightarrow{BA}$
A. $\begin{pmatrix}3\\4\end{pmatrix}$.
$B.\ \begin{pmatrix}-3\\-4\end{pmatrix}$
C. $\begin{pmatrix}4\\-3\end{pmatrix}$
D. $\begin{pmatrix}4\\6\end{pmatrix}$

24. The image of A(x, y) is A_1(-2, -4). Find the coordinate of A under rotation through 180° about the origin
A. A(2, 4)
B. A(2, -4)
C. A(-2, 4)
D. A(3, 4)

25. Simplify $6p^3xp^2 \div 3p^4$
A. 2p
B. 3p
C. 18p
D. $2p^2$

26. Given that $y = ax + 5$, find the relation when $x = 1, y = 0$
$A.\ Y = -5x + 5.$
B. $Y = x + 5$
$C.\ Y = 5x + 5.$
$D.\ Y = 2x + 4.$

27. Amina spent $\frac{17}{35}$ of her pocket money on transport and food. If she spent $\frac{2}{7}$ on transport only, what fraction does she spend on food?

A. ¼.

B. $\frac{1}{5}$.

C. $\frac{5}{7}$.

D. $\frac{15}{28}$

28. If $x \rightarrow 3x - 4$, what is the image of -2?

A. -10
B. -2
C. -1
D. 2

29. The ratio $9: x$ is equivalent to $36: 20$. What is the value of x?

A. 4
B. 5
C. 6
D. 8

30. If $a * b = 2a - b$, evaluate $4 * 3$

A. 1
B. 2
C. 4
D. 5

31. It takes 15 men, 48 days to weed a plot of land. How many men can weed the same plot of land in 16 days, if they work at the same time?

A. 5
B. 18
C. 32
D. 45

32. Factorize $3r^2s - 9rs^2$

$A. rs(3r - 5)$.
B. $3rs(s - 3r)$.
C. $3rs(r - 3s)$.
E. $r^2s^2(3r - 3r)$.

33. If $4(m + 4) = 18$, find the value of m

A. $\frac{1}{2}$.

B. $\frac{3}{2}$.

C. $\frac{5}{2}$.

D. $\frac{7}{2}$.

34. Kofi is n years now. How old will he be 10 years from now?

A. (10+n) years
B. (n+10) years
C. (n-10) years
D. (10-n) years

35. Solve 3(x-3) +4 = 2x

A. -2
B. 3
C. 2
D. 5

36. Evaluate -3-(-5-5-2)

A. 9
B. 10
C. 11
D. 8

37. Which of the following describes the locus of points equidistant from two fixed points?

A. Bisection of angle
B. Construction of circle
C. Bisection of a line
D. construction of arc

38. A map is drawn to a scale 1:100,000. What will be the distance in kilometers is represented by 5cm on the map.

A. 0.5k m
B. 5km
C. 50km
D. 500km

39. The average salary of a family of five is GH₵500.00. Calculate the total salary of the family.

A. GH₵25000.00.
B. GH₵5000.00.
C. GH₵2500.00
D. GH₵500.00

40. A polygon of side 6. Fid the interior angle

A. 60°
B. 120°
C. 40 °
D. 30°

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MARKING SCHEME

MATHEMATICS PAPER 2(60MARKS)

QUESTION 1

a) $\left(3\frac{1}{2}+\frac{1}{4}-\frac{1}{8}\right)\div 2\frac{1}{4}$

$=\left(\frac{7}{2}+\frac{1}{4}-\frac{1}{8}\right)\div\frac{9}{4}$ ……M1

$=\left(\frac{(7\times4)+(1\times2)-(1\times1)}{8}\right)\div\frac{9}{4}$ ……B 1

$=\left(\frac{28+2-1}{8}\right)\div\frac{9}{4}$ ……B 1

$=\frac{29}{8}\div\frac{9}{4}$ ……B ½

$=\frac{29}{8}\times\frac{4}{9}$ ……B ½

$=\frac{29}{18}=1\frac{11}{18}$ ……M ½ , A ½

TOTAL MARKS =5MARKS

b) Total fraction = 1, total money = x, Pocket money left= GH₵10.50

Items spent money on	Fraction spent	Fraction left
Food	1/4	$1-\frac{1}{4}=\frac{3}{4}$
Sweets	1/6	$1-\frac{1}{6}=\frac{5}{6}$
classes	1/5	$1-\frac{1}{5}=\frac{4}{5}$
	Total fraction left	$\frac{3}{4}\times\frac{5}{6}\times\frac{4}{5}=\frac{1}{2}$

*NOTE: Working of fraction left can be any method and procedure……M2

Total fraction = total money

Fraction left = money left……M ½

$1=x.$

$\frac{1}{2} = 10.50.$ .....M ½

$\frac{1}{2}x = 1 \times 10.50$.....M ½

$\frac{1}{2}x = 10.50.$ .....B ½

$\frac{1}{2}x \times 2 = 10.5 \times 2.$ .....M ½

$x = 21.$

$The\ pocket\ money = GH¢21.00.$ .....A ½

***TOTAL MARKS = 5MARKS**

c) $m = \begin{pmatrix} 2x-3 \\ 3-3y \end{pmatrix}, n = \begin{pmatrix} 4-x \\ y+2 \end{pmatrix}$

$m + 2n = \begin{pmatrix} 5 \\ 4 \end{pmatrix},$

$\begin{pmatrix} 2x-3 \\ 3-3y \end{pmatrix} + 2\begin{pmatrix} 4-x \\ y+2 \end{pmatrix} = \begin{pmatrix} 5 \\ 4 \end{pmatrix},$ . .....M ½

$\begin{pmatrix} 2x-3 \\ 3-3y \end{pmatrix} + \begin{pmatrix} 8-2x \\ 4y+8 \end{pmatrix} = \begin{pmatrix} 5 \\ 4 \end{pmatrix},$ . .....B ½

$2x - 3 + 8 - 2x = 5.$ . .....M ½

$2x - 2x + 5 = 5.$ . .....B ½

$x = 0.$ . .....A ½

$3 - 3y + 4y + 8 = 4.$ . .....M ½

$3 + 8 + y = 4.$ . .....B ½

$11 + y = 4.$ . .....M ½

$y = 4 - 11.$ . . ..A ½

$y = -7.$ . . ..A ½

$x = 0, y = -7.$

***TOTAL MARKS (a+b+c=15marks)**

QUESTION 2

a) (i) $S_n = \frac{n}{2}[a + (n-1)d]$

$a = 3, n = 10 \; and \; d = 2.$

$S_n = \frac{10}{2}[3 + (10-1)2]$. . ……M ½

$S_n = 5[3 + (9)2]$. . ……B ½

$S_n = 5[3 + 18]$. . …… M ½

$S_n = 5(21)$. ……M ½

$S_n = 105$. . ……A ½……TOTAL = 2 ½ MARKS

(ii) $S_n = \frac{n}{2}[a + (n-1)d]$.

$2 \times S_n = 2 \times \frac{n}{2}[a + (n-1)d]$. ……M ½

$2S_n = [a + (n-1)d]$. ……B ½

$2S_n = a + (n-1)d.$

$2S_n - a = (n-1)d.$ ……M ½

$\frac{2S_n - a}{(n-1)} = \frac{(n-1)d}{(n-1)}$. ……M ½

$\frac{2S_n - a}{(n-1)} = d.$

$\frac{2S_n - a}{(n-1)} = d.$

$d = \frac{2S_n - a}{(n-1)}$. ……A ½……TOTAL = 2 ½ MARKS

b) ∠ QPS = 35° and ∠ QRT = 55°.

∠ PQR=∠ PQM +∠ RQM. ……M 1

∠ PQM= ∠ QPS =35° Alternate angle. ……B 1

∠ RQM= ∠ QRT = 55° Alternate angle. ……B 1

∠ PQR=35°+55° . ……M 1

∠ PQR=90° . ……A 1

***TOTAL MARKS = 5MARKS**

c) New price = GH₵90.00, discount = 10%

New price = $\frac{(100-10)}{100} \times original \; price$……B 1

90.00 = $\frac{90}{100} \times original \; price$……M 1

$90 \times 100 = 90 \times original \; price.$ …… M 1

$\frac{90 \times 100}{90} = \frac{90 \times original \; price}{90}$. ……B 1

original price = GH₵100.00 ……A 1……TOTAL MARKS=5MARKS

*TOTAL MARKS = a+b+c= 15marks

QUESTION 3

$(a) 4x^2 - 9y^2$

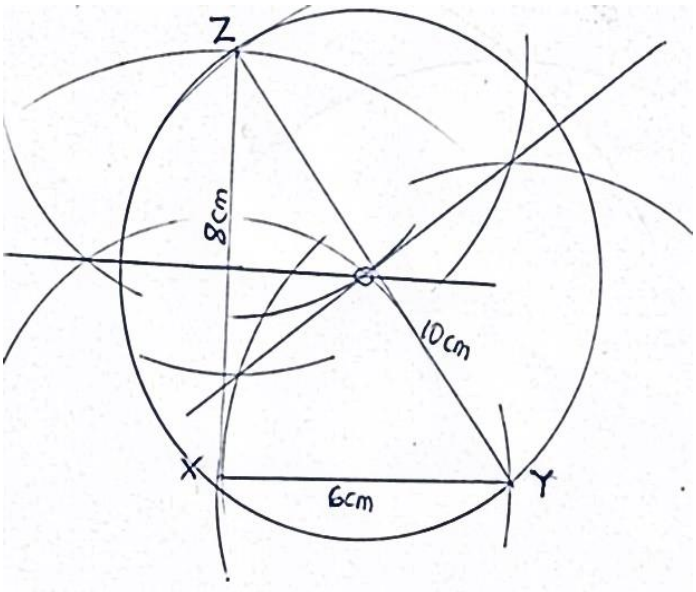
$= 2^2x^2 - 3^2y^2$. ……B ½

$(2x)^2 - (3y)^2$. ……M ½

$(2x + 3y)(2x - 3y)$. ……A 1

TOTAL MARKS = 2MARKS

b) CONSTRUCTION ……..13MARKS



NOTE:

1. ***Line XY correct measurement with construction arcs ……..1mark***
2. ***Line ZY correct measurement with construction arcs ……..1mark***
3. ***Line ZY correct measurement with construction arcs ……..1mark***
4. ***Joining of points XYZ to form triangle correct ……3marks***
5. ***Mediator of YZ……2marks***
6. ***Mediator of YZ……2marks***
7. ***Locating O at the intersection ……1mark***
8. ***Construction of circle touching all the vertices……2marks***
9. ***TOTAL MARKS……13MARK***S

QUESTION 4

a. Sales = price ×quantity. …… M ½

School items	***Quantity***	***Price***	***Sales***
Pens	20	GH₵10.00	GH₵200
Books	30	GH₵9.00	GH₵270
School bags	15	GH₵30.00	GH₵450
School uniforms	18	GH₵20.00	GH₵360
Textbooks	35	GH₵4.00	GH₵140
Mathematical sets	4	GH₵5.00	GH₵20

Total sales =200+270+450+360+140+20 = GH₵1440. ……$^1/_2$ mark each……A 2 ½

b. Average sales = $\frac{Total\ sales}{Number\ of\ school\ items}$. …… B ½

$Total\ sales = \text{GH₵}1440.$

$Number\ of\ school\ items = 6.$. …… M ½

$Averages\ sales = \frac{1440}{6}$. . …… M 1

$Averages\ sales = \text{GH₵}240.$. …… A 1

*TOTAL MARKS = 3MARKS

c. Pie chart. ……A3…..$^1/_2$ marks each for the angles…..total marks 3marks

School items	***Sales***	***Sectorial angles***
Pens	GH₵200	$\frac{200}{1440} \times 360 = 50°$
Books	GH₵270	$\frac{270}{1440} \times 360 = 67.5$

School bags	GH₵450	$\frac{450}{1440} \times 360 = 112.5°$
School uniforms	GH₵360	$\frac{360}{1440} \times 360 = 90°$
Textbooks	GH₵140	$\frac{140}{1440} \times 360 = 35°$
Mathematical sets	GH₵20	$\frac{20}{1440} \times 360 = 5°$
Totals	GH₵1440	360

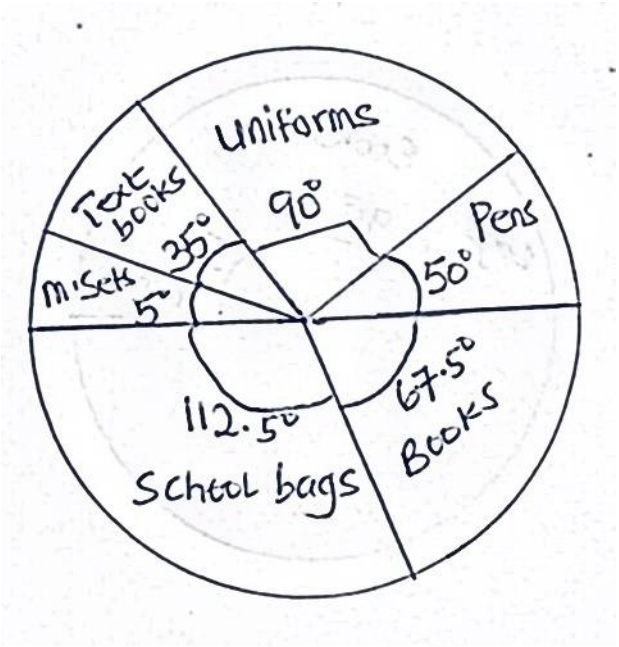


Diagram of a pie chart……..4marks

d. Percentage of mathematical sets sales$= \frac{20}{1440} \times 100$……..M1
Percentage of mathematical sets sales = 1.39%.....A1

QUESTION 5

a. DC = 24m, BC = 16m, Base of triangle = 16m, height of triangle = 10m
Area of rectangle = length × breadth…… B ½
Area = 24 × 16 …… M ½
Area = 384m^2…… A ½
Area of triangle = ½ × $base \times height$…… B ½
Area = ½ × 16 × 10…… M ½
Area = 80m^2……A ½

Area of the shaded portion = area of the rectangle –area of triangle ……B ½

Area of the shaded portion = $384m^2 - 80m^2$…… M ½

Area of the shaded portion = $304m^2$……A1

*TOTAL MARKS = 5MARKS

b. $\frac{2}{x} - 2 = \frac{3}{2x} + 3$

$2x \times \frac{2}{x} - 2 \times 2x = \frac{3}{2x} \times 2x + 3 \times 2x.$ …… B1

$4 - 4x = 3 + 6x.$ …… M ½

$4 - 3 = 6x - 4x.$ …… M ½

$1 = 2x.$ …… M1

$\frac{1}{2} = \frac{2x}{2}.$ …… M1

$x = \frac{1}{2}.$ …… A1

***TOTAL MARKS = 5MARKS**

c. Let n(U) = total students, n(T) =number of Twi, n(G)= number of Ga, n(x) =both Twi and Ga

n(N) = neither Twi nor Ga

n(U) = 80

n(T) = $\frac{40}{100} \times 80 = 32\ students$

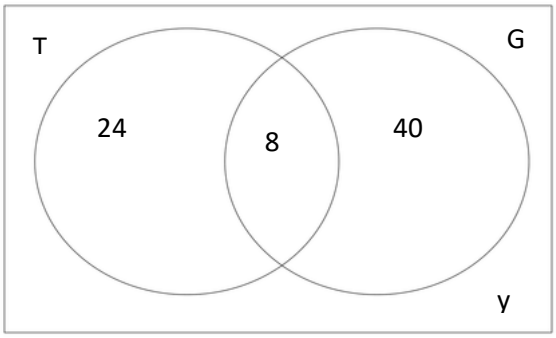
n(G) =$\frac{60}{100} \times 80 = 48\ students$

n(x) =$\frac{10}{100} \times 80 = 8\ students$

n(N) = y…… M1

1 ½ MARKS FOR DIAGRAM

n(U) = 80



$only\ Twi + only\ Ga + None = total\ students.$ ……M ½

$24 + 8 + 40 + y = 80.$ …… M ½

$72 + y = 80$. ..... M ½

$y = 80 - 72$. ..... M ½

$y = 8$.

$neither\ \ Twi\ nor\ \ Ga = 8\ students$ ..... A ½

QUESTION 6

a. Total amount = GH₵2700.00
Ratio: Kofi : Amma : Yaw = 2 : 3 : x
Total ration = $5 + x$
Yaw's share = GH₵900

$(i)\ \frac{x}{5+x} \times 2700 = 900$. .....B ½

$\frac{2700x}{5+x} = 900$. ..... M ½

$2700x = 900(5 + x)$.

$2700x = 4500 + 900x$. ..... M ½

$2700x - 900x = 4500$.

$2700x - 900x = 4500$. ..... B ½

$1800x = 4500$. .....M ½

$\frac{1800x}{1800} = \frac{4500}{1800}$. ..... M ½

$x = 2.5$. ..... A 1

$(ii) the\ total\ for\ kofi\ and\ Amma = 2700 - 900 = 1800$.

$kofi's hare = \frac{2}{5} \times 1800 = GH₵720.00$. .....M1 A 1

$kofi'share = \frac{3}{5} \times 1800 = GH₵1080.00$.. .....M1 A 1

(b) (i) principal amount = $GH₵24000.00$, time =5years, rate = 2 ½ %

Interest = $\frac{PRT}{100}$. .....B ½

$interest = \frac{24000 \times 2\frac{1}{2} \times 5}{100}$. .....M ½

$interest = \frac{24000 \times \frac{5}{2} \times 5}{100}$. ……M ½

$interest = \frac{12000 \times 1 \times 5}{100}$. ……M ½

$interest = \frac{60000}{100}$

$interest = GH¢600.$. …… A ½

Total amount = principal amount + interest . ……B ½

Total amount = 24000+600= GH₵24600. …… A 1

TOTAL MARKS = 4MARKS

(ii) yearly installment = $\frac{total\ amount}{5}$. ……B1

yearly installment = $\frac{24600}{5} = GH¢4690$. ……M1 A 1

TOTAL MARKS = 3MARKS

TOTAL MARKS= a+b= 15marks

PAPER 1

1. A
2. B
3. A
4. B
5. B
6. C
7. A
8. A
9. A
10. C
11. D
12. B
13. D
14. D
15. B
16. C
17. B
18. B
19. B
20. B
21. C
22. A
23. B
24. A
25. A
26. A
27. B
28. A
29. B
30. D
31. D
32. C
33. A
34. B
35. D
36. A
37. C
38. B
39. C
40. B

DAS BECE BOOSTER
MATHEMATICS
Essay and Objective
2 hours

2&1

NAME……

INDEX NUMBER …….……....

DAS B.E.C.E PERFORMANCE BOOSTER

BASIC EDUCATION CERTIFICATE MOCK

2 hours

MATHEMATICS 2&1

*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, on 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 45 minutes.

The use of calculators is not allowed.

PAPER 2 [60 MARKS] 1HOUR

Essay

Answer four questions only

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

PAPER 2 1HOUR [Answer four questions only] 60MARKS

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

1.(a) In an examination, 50 candidates sat for either Mathematics or English Language. 60% passed in Mathematics and 48% passed in English Language. If each candidate passed in at least one of the subjects, how many candidates passed in :

i. Mathematics?
ii. English Language?

(b) Illustrate the information given in (a) on a Venn diagram.

(c) Using the Venn diagram, find the number of candidates who passed in

(i) both subjects;

(ii) Mathematics only.

2(a). Evaluate $\frac{0.0084}{0.025} \div \frac{0.00042}{0.0075}$ leaving your answer in standard form

(b). A rectangular metal plate of length 12m and width 10m. A square plate of side xm is cut off from the rectangular metal plate. If the area of remaining plate is $95m^2$

Find the side and area of the square cut off.

(c). A ship leaves port A at 8.30am and arrives in port B at 5.30am. If the ship travels at an average speed of 75 km/hr, how far is it from port A to port B?

3. Using ruler and a pair of compasses only,
   a. Construct triangle ABC such that, $|AB|$=8cm, $< ABC = 120^0$ and $< BAC = 30^0$
   b. Construct the mediator of $< ABC$
   c. Construct the mediator of $|AB|$
   d. Using O, the point of intersection of the mediators and radius OA, draw a circle, measure the radius.

4. (a) Three friends Ata, Abam and Anto shared some oranges in the ratio 3: 2: 5. Averagely each person has 80 oranges. Calculate

(i) Ata's share

(ii) Abam's Share

(iii) the quantity of oranges Anto had more than Abam

(b) Given that vectors **p** = $\begin{pmatrix}2\\2\end{pmatrix}$ and **q** = $\begin{pmatrix}x\\y\end{pmatrix}$, find :

(i) **q** if **q** – **p** = $\begin{pmatrix}12\\9\end{pmatrix}$;

(ii) the magnitude of the vector **q** – **p**

5.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

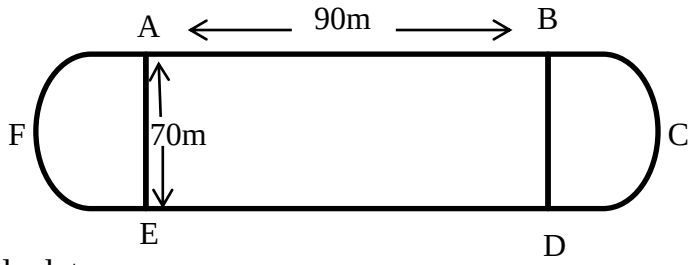
(a) Using a graph sheet, draw a bar chart for the distribution

(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.

6. The diagram below shows a running track ABCDEF, AB and ED are the straight sides. The ends AFE and BCD are semi- circular shapes. AB=ED=90m and AE=BD=70m.

[Take $\pi = \frac{22}{7}$]



a. Calculate

i. The total length of the two semicircular ends, AFE and BCD

ii. The perimeter of the running track ABCDEFA.

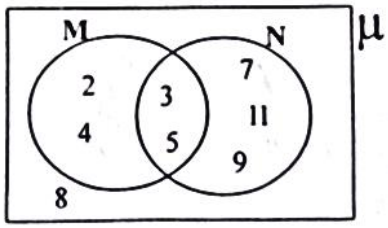
iii. The total area of the running track ABCDEFA

b. Simplify $\frac{m^2-5m+6}{m-3}$

PAPER 2 [40 Marks] 1 Hour

Now answer the following questions.

1. The Venn diagram shows the relationship between two sets M and N which are subsets of the universal set U. Which of the following represent the set N?

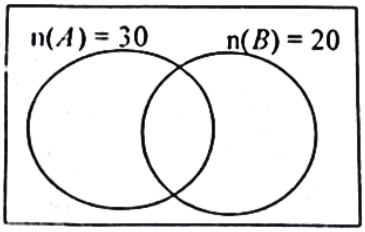


A. {3,5}
B. {7,9,11}
C. {2,3,4,5,8}
D. {3,5,7,9,11}

2.If P= {1,2,3,4,5,6,7,8,9} and Q= $\{x: x < 4, where\ x\ is\ an\ even\ number\}$,find P ∩ Q.

A. {2}
B. {6,8}
C.{4,6,8}
D. {2,4,6,8}

3. In the Venn diagram ,set A has 30 members and set B has 20 members. If A U B =45, find A ∩ B.



A. 25
B. 15
C. 10
D. 5

3. What is the value of two(2) in the numerals 428,555

A. 200
B. 2,000
C. 20,000
D. 200,000

5. Subtract nine hundred and twenty-five from one thousand and fourteen.

A. Ninety-eight
B. Eighty-nine
C. One hundred and one
D. Eight hundred and nine

6. At midnight the temperature was -11℃ and by noon it was 3℃. What was the rise in temperature?

A. 8℃
B. 9℃
C. 10℃

D. 14℃

7. Simplify: $\frac{3}{10} \div \frac{5}{18}$
   A. $\frac{1}{12}$
   B. $\frac{12}{25}$
   C. $1\frac{2}{25}$
   D. $12\frac{1}{2}$
8. What is the largest prime factor of 225?
   A. 3
   B. 5
   C. 15
   D. 17
9. Evaluate $8^2 \div (32 \div 2) - 2(3 - 5)$.
   A. -2
   B. 4
   C. 8
   D. 16
10. A square has the same perimeter as a rectangle. The rectangle is of length 10cm and breadth 6cm. Find the area of the square.
   A. $64cm^2$
   B. $60cm^2$
   C. $32cm^2$
   D. $16cm^2$
11. In a class, 55% of the students are girls. What is the ratio of number of boys to girls?
   A. 1:20
   B. 9:11
   C. 9:20
   D. 11:9
12. Simplify : $\frac{7}{8} \div 1\frac{2}{3}$.
   A. $\frac{21}{40}$
   B. $1\frac{1}{8}$
   C. $\frac{20}{41}$
   D. $\frac{19}{40}$
13. Express the ratio 240cm : 21m in the simplest form.
   A. 3 : 2
   B. 4 : 3
   C. 8 : 7
   D. 8 : 70
14. What is the total cost of x shirt at GH₵ 5.00 each and y shirt at GH₵ 1.50 each?
   A. GH₵ (5x +1.5y)
   B. GH₵ (5y + 1.5x)
   C. GH₵ 5(x + 1.5y)
   D. GH₵ 1.5(5x +y)
15. A trader can buy 24 tins of milk at GH₵ 0.85 each. If a sachet of milo costs GH₵ 1.20, how many sachet can he buy with the same amount?
   A. 11
   B. 17
   C. 20
   D. 22
16 Evaluate: $\frac{5.6 \times 10^4}{1.4 \times 10^2}$
   A. 4.0×10^{-6}

B. 4.0×10^{-2}
C. $4.0\ 10^{2}$
D. 4.0×10^{6}

17. If 3 out of 8 pupils in a class of 48 like football, how many pupils like football in the class?
A. 6
B. 18
C. 24
D. 36

18. Simplify : $3\frac{3}{4} \times (\frac{1}{6} + \frac{3}{10})$.
A. $1\frac{1}{4}$
B. $1\frac{3}{4}$
C. 4
D. 7

19. A bag contains 18 green and 3 white identical balls . If a ball is picked at random from the bag ,find the probability that the ball is white .
A. $\frac{1}{7}$
B. $\frac{1}{3}$
C. $\frac{2}{3}$
D. $\frac{6}{7}$

20. A shop increased all its prices by 8%. If a man bought an article for GH₵ 540,000.00 from the shop, find the original price of the article.
A. GH₵ 496,800.00
B. GH₵ 500,000.00
C. GH₵ 543,200.00
D. GH₵583,200.00.

21. 0.0000437 in standard form
A. 4.37×10^{-5}
B. 4.37×10^{-4}
C. 4.37×10^{3}
D. 4.37×10^{4}

22. A farmer feeds 20 pigs with 500kg of cassava. How many pigs can be fed with 200kg of cassava?
A. 2
B. 5
C. 8
D. 10

23. The interior angles of a hexagon are x^0, x^0, $2x^0$, $3x^0$, $4x^0$ and $4x^0$. Find the value of x.
A. 12^0
B. 24^0
C. 48^0
D. 60^0

24. Kofi bought a book of GHC 45.0 and sold it for GH₵ 40.00. Find the percentage loss.
A. 2.5 %
B. 22 %
C. 2.25%
D. 11 %

25. If x = -2, evaluate $x^2 - 4x + 14$.
A. 20
B. 18
C. 26
D. 12

26. Find the sum of money that will yield an interest of GH₵ 450.00 in three years at 15 % per annum simple interest.

A. GH₵ 1,000.00
B. GH₵ 1,350.00
C. GH₵2,025.00
D. GH₵ 2,552.00

27. Find the mean score of the following test scores: 5, 4, 4, 5, 5, 5, 6 and 6.
A. 4
B. 5
C. 6
D. 8

28. A trader made a profit of 20 % after selling her goods for GHC 180.00. Find the cost price
A. GH₵ 36.00
B. GH₵ 144.00
C. GH₵150.00
D. GH₵ 216.00

29. Make *p* the subject of the relation: q = $\frac{p+5}{5}$
A. p = 5(q – 1)
B. p = 5q – 1
C. p = 5(q + 1)
D. p = 5q + 1

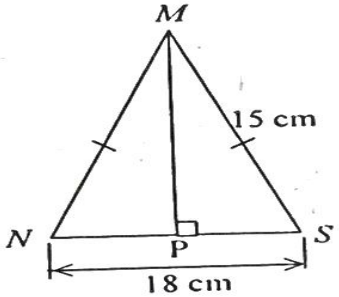
30. What is the gradient of the line passing through A(-2, -3) and B(-3, 7)?
A. 10
B. $\frac{4}{5}$
C. - $\frac{1}{2}$
D. - 10

31. The volume of oil in a rectangular tank is 60cm^3. The length of the tank is 6cm and its breadth is 2cm. Calculate the depth of oil in the tank.
A. 3cm
B. 4cm
C. 5cm
D. 6cm

32. Make x the subject of the relation: y = $\frac{n-x}{x}$
A. x = $\frac{n-1}{y}$
B. x = $\frac{n+1}{y}$
C. x = $\frac{n}{y-1}$
D. x = $\frac{n}{y+1}$

33. How many faces has a triangular pyramid?
A. 3
B. 4
C. 5
D. 6

34. In triangle MNS, |MN|=|MS|= 15cm and |NS|=18cm. Find |MP|.



A. 3cm
B. 4cm

C. 9cm
D. 12cm

35. What is the rule for the mapping?

X	0	1	2	3	4
Y	0	1	4	9	16

A. $x \rightarrow x$
B. $x \rightarrow x^2$
C $x \rightarrow 2x$
D. $x \rightarrow 4x$

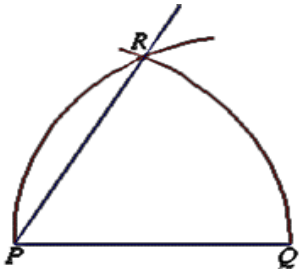
36. If $a = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$, find the value of $2a$
A. $\begin{pmatrix} 7 \\ 10 \end{pmatrix}$
B. $\begin{pmatrix} 6 \\ 10 \end{pmatrix}$
C. $\begin{pmatrix} 9 \\ 10 \end{pmatrix}$
D. $\begin{pmatrix} -6 \\ -10 \end{pmatrix}$

37. The bearing of X from Y is 045^0. Find the bearing of Y from X.
A. 145^0
B. 185^0
C. 225^0
D. 235^0

38. Find the length of the vector $\begin{pmatrix} 6 \\ 8 \end{pmatrix}$.
A. 10 units
B. 12 units
C. 14 units
D. 16 units

39. Find the circumference of a circle whose area is $100\pi cm^2$.
A. $5\pi cm$
B. $10\pi cm$
C. $15\pi cm$
D. $20\pi cm$

40. From the construction, what is angle RPC?



A. 60^0
B. 30^0
C. 80^0
D. 150^0

MATHEMATICS

MARKING SCHEME-MAY 2021

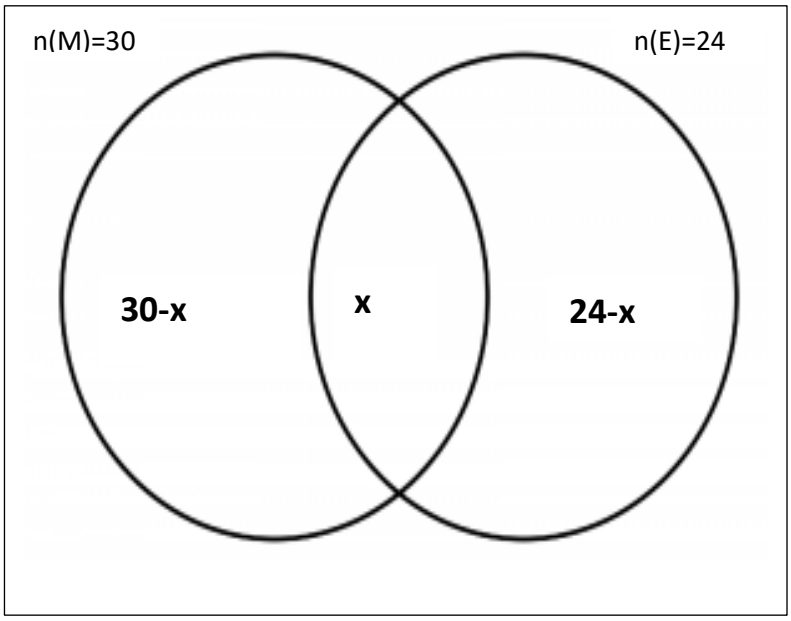
QUESTION 1a

Let n(U) = total candidate = 50, n(M∩E)=x

(i) n(M) = passed in Mathematics = $\frac{60}{100} \times 50 = 30$ candidates…….. A ½

(ii) n(E) = passed in English Language = $\frac{48}{100} \times 50 = 24$ candidates……..A ½

QUESTION 1b ……A2



QUESTION 1c.

i. Both subject;

$30 - x + x + 24 - x = 50$……M ½

$54 - x = 50$…… B ½

$54 - 50 = x$……M ½

$x = 4$……A ½ ……..2Marks

Both subjects is 4 candidates

ii. Mathematics only = $30 - x = 30 - 4 = 26\ candidates$……A1

QUESTION 2a.

$\frac{0.0084}{0.025} \div \frac{0.00042}{0.0075} = \frac{0.0084}{0.025} \times \frac{0.0075}{0.00042}$……M1

$= \frac{84\times10^{-4}}{25\times10^{-3}} \times \frac{75\times10^{-4}}{42\times10^{-5}}$……B1

$= \frac{84\times75\times10^{-4}\times10^{-4}}{25\times42\times10^{-3}\times10^{-5}}$.

$= \frac{84\times75\times10^{-8}}{25\times42\times10^{-8}}$……M1

$= \frac{2\times3\times10^{-8}}{1\times10^{-8}}$……M1

$= 6 \times 10^{8-(-8)} = 6 \times 10^{0}$……A1=5Marks

QUESTION 2b

Length =12m, width 10m, side of a square xm, Area of the rem =$95m^2$……B ½

Remaining area =area of rectangle −area of square……B ½

$95 = LB - x^2$……M ½

$95 = 12 \times 10 - x^2$……M ½

$95 = 120 - x^2$……B ½

$x^2 = 120 - 95$……M ½

$x^2 = 25$……M ½

$x^2 = 5^2$…… M ½

$x = 5m$……A1=5marks

The side of the square 5m

QUESTION 3c.

Starting time = 8:30am, ending time= 5:30am, duration =21hours……B 1

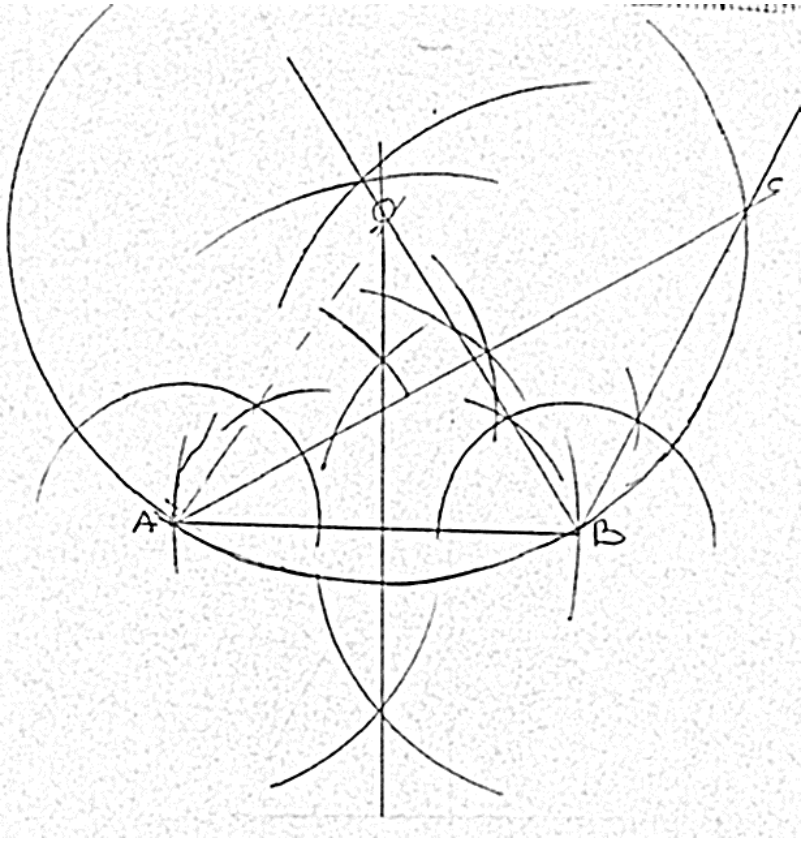
Average speed = $\frac{Total\ distance}{Time}$……B 1

$75 = \frac{Total\ distance}{21}$……M 1

$total\ distance = 75 \times 21$……M1

Total distance = 1575km……..A1=5MARKS

QUESTION 3



MARKING

1. Line AB=8cm with arcs ……2marks
2. Angle 120 degrees……2marks
3. Angle 30 degrees ……2marks
4. Naming triangle ABC and joining……2marks
5. Bisect of angle ABC……2Marks
6. Bisector of AB……2marks
7. Location of intersection……1mark
8. Circle ……1marks
9. Radius = 7.5cm ……1= 15marks

QUESTION 4a.

Ratio; Ata :Abam: Anto

3: 2: 5, Total = 3+2+5 =10

$average\ share = 80\ oranges.$

$Average = \frac{Total}{number\ of\ people}$……B ½

$80 = \frac{Total}{3}$……B1

Total = 240 oranges……A ½

i. Ata's share = $\frac{3}{10} \times 240$ = 72 oranges……M1.A1

ii. Abam's share =$\frac{2}{10} \times 240 = 48$ oranges ……M1A1

iii. Anto's share =$240 - 72 - 48 =$120 orange

120-48 = 72 oranges……M 1 A1=8MARKS

QUESTION 4b.

$p = \binom{2}{2}, q = \binom{x}{y}$

(i) $q - p = \binom{12}{9}$;

$\binom{x}{y} - \binom{2}{2} = \binom{12}{9}$……B ½

$x - 2 = 12$……M ½

$x = 12 + 2$…… M ½

$x = 14$……A1

$y - 2 = 9$…… M ½

$y = 9 + 2$……M ½

$y = 11$……A1

$x = 14, y = 11$……A ½ =4marks

(ii) $p - q = \binom{14}{11} - \binom{2}{2}$

$p - q = \binom{12}{9}$……B ½

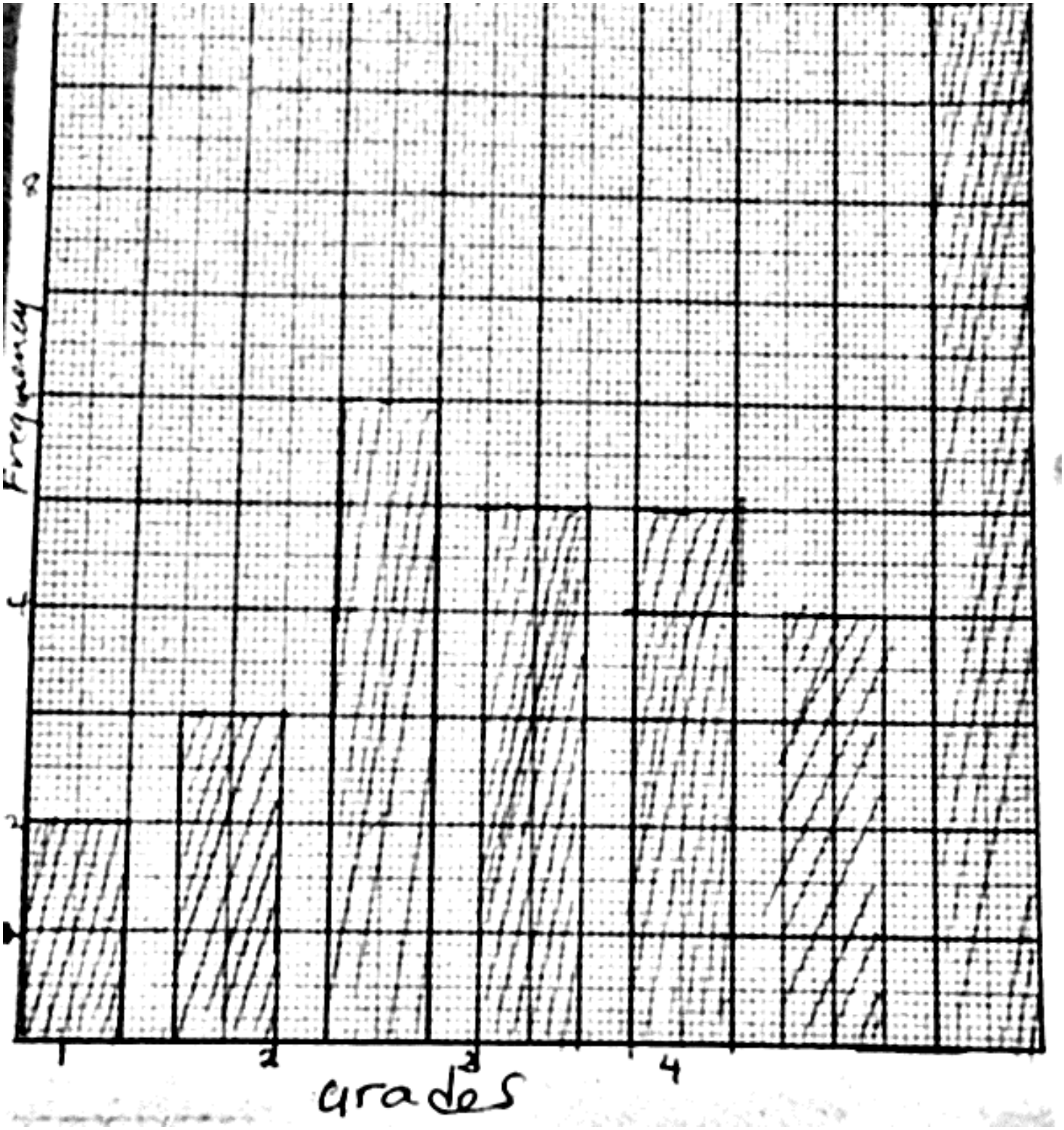
$|p - q| = \sqrt{12^2 + 9^2}$……M ½

$|p - q| = \sqrt{144 + 81}$……M ½

$|p - q| = \sqrt{225}$……B ½

$|p - q| = 15units$……A 1 =3Marks

QUESTION 5a……..8marks



QUESTION 5b.

Candidates awarded credit = 5+4+10 =19……A1

Total frequency=2+3+6+5+4+10 = 40……A1

Probability of candidates with credits = $\frac{19}{40}$……A1=3marks

QUESTION 5c……table ……B2

Grade	Frequency	fx
1	2	2
2	3	6
3	6	18
4	5	30
5	4	20
6	10	60
	$\sum f = 30$	$\sum fx$ =136

$mean = \frac{\sum fx}{fx}$……B ½

Mean = $\frac{136}{30}$. ……M ½

Mean = $4\frac{16}{30}$……A1= 4marks

QUESTION 6a.

$\pi = \frac{22}{7}, diameter = 70m,\ radius = \ 35m, length = 90m$……B ½

(i) Two semi-circle = circumference =πd……B ½

Circumference = $\frac{22}{7} \times 70$……M1

Circumference =$22 \times 10 = 220m$……A1=3marks

(ii) The perimeter of ABCDEFA = ED + DCB +BA +AFE……B1

Perimeter of ABCDEFA = 220+90+90 =400m……M1A1=3marks

(iii) The total area of ABCDEFA = Area of 2 semi-circle + area of rectangle ……B ½

The total area of ABCDEFA $= \frac{22}{7} \times 35^2 + 90 \times 70$……M ½

Area = $\frac{22 \times 35 \times 35}{7} + 630$……M1

Area = $22 \times 5 \times 35 + 630$……M1

Area = 3850 + 630 =4480m^2……A1=4marks

QUESTION 6(b).

$\frac{m^2-5m+6}{m-3} = \frac{m^2-3m-2m+6}{m-3}$……B1

$= \frac{(m^2-3m)-(2m-6)}{m-3}$……M1

$\frac{m(m-3)-2(m-3)}{m-3}$……M1

$\frac{(m-3)(m-2)}{(m-3)} = m-2$……M1…..A1=5marks

PAPER 1

1. D
2. A
3. D
4. C
5. B
6. D
7. C
8. B
9. C
10. A
11. B
12. A
13. D
14. A
15. B
16. C
17. B
18. B
19. A
20. A
21. A
22. C
23. C
24. D
25. C
26. A
27. B
28. D
29. A
30. D
31. C
32. D
33. B
34. D
35. B
36. B
37. C
38. A
39. D
40. A

DAS BECE BOOSTER
MATHEMATICS
Essay and Objective
2 hours

2&1

NAME……

INDEX NUMBER ……..……....

DAS B.E.C.E PERFORMANCE BOOSTER

BASIC EDUCATION CERTIFICATE MOCK

2 hours

MATHEMATICS 2&1

*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, on 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 45 minutes.

The use of calculators is not allowed.

PAPER 2 [60 MARKS] 1HOUR

Essay

Answer four questions only

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

PAPER 2 1HOUR [Answer four questions only] 60MARKS

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

1. (a) **(b)** Mr. Amissah started a farm by using $\frac{1}{4}$ of the land for cassava cultivation, he used $\frac{1}{5}$ of the remaining land for maize cultivation, he cultivated cocoa with $\frac{1}{6}$ of the remaining land. If he used the rest, 100 acres of the land for sugar cane cultivation, what is the total acreages of land cultivated by Mr. Amissah.

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

(c) A box contains 5 red balls, x green balls and 9 black balls. If the probability of picking a black ball at random in the box is $\frac{9}{20}$, find

i. the value of x
ii. the probability of red ball

2. (a) Given that $A = 25 \times 10^{-3}$, $B = 5 \times 10^{-4}$, $C = 45 \times 10^{-2}$ and $D = 35 \times 10^{-5}$.
Evaluate in standard form the value of $\frac{DC}{AB}$

(b) Make y the subject in $\frac{5t}{y} = \frac{2}{t}$

(c) A landlady modelled the rent of her house as $R = Pi^2$, where R is rent, P is principal money paid and i, is rate of rent. Find the value of rent if $P = GH¢1200$ *and* $i = 10$

3. (a) Mr. Kofi Ako invested GH¢12000.00 in a bank for 5years at 10% simple interest per annum. Calculate the

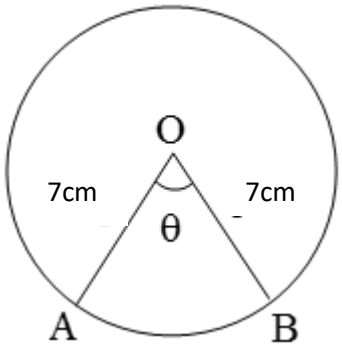
i. total amount he will received from the bank at the end of the period.
ii. Yearly installment

(b) A man bought a television set at GH¢500.00. If 10% discount was allowed. Calculate

i. the discount paid
ii. the new price of the television set

(c) A shop seller was promised 10% commission. If she sold GH¢10000 worth of items. Find her commission

4. (a) The figure below represents a circle with centre O, radius 7cm and angle θ subtended at the centre.



$\pi = \frac{22}{7}$

If the length of arc AB is 11cm. Calculate

i. the value of angle θ
ii. the area of the sector OAB

(b) The data below represents time (hours) intervals that form three students in a school completed their Mathematics test during an examination. Use it to answer the questions.

1, 2, 1, 2, 3 ,4, 3, 4 ,5, 2, 1, 2, 3, 4, 5, 6, 7, 8, 9 ,2 ,4, 5,

6 ,7, 8, 9, 1, 2 ,3 ,4, 4, 5, 6 ,3, 3 ,3, 3, 3, 3 ,2, 3, 4, 5 ,9

i. Calculate the average time spent during the examination
ii. which time did most students used to complete their examination?

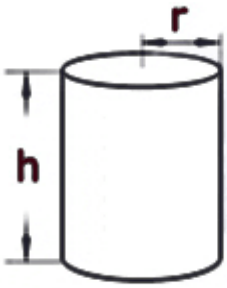
5. (a) Two ships A and B sailed a distance of $D_A = (200 + t^2)km$ and $D_B = (100 + 2t^2)km$ respectively. Where D_A is the distance covered by ship A, D_B is the distance covered by ship B and t is time in hours. Calculate

i. the time t that ship A and ship B will meet
ii. the total distance covered by the ships at the time of meeting
iii. find average speed of the ships at the time of meeting

(b) Factorize completely $mn + 3np + 5m + 15p$

(c) Make R the subject of the relation $A = P(1 + RT)$, **hence find** R if $P = 1000, A = 20000$ and $T = 2$

6.(a) The solid figure below represents a solid cylinder whose height doubles the radius, with the curved surface area $88cm^2$.



(Take $= \frac{22}{7}$)

Calculate

i. the radius of the cylinder
ii. the height of the cylinder
iii. the volume of the cylinder

(b) If the water in the cylinder is to be poured into a water tank in the form of a cuboid with the length twice the width. If the height of the cuboid is 22cm. Find the length and the width.

PAPER 2 [40 Marks] 1 Hour

1. List the members of the set Q = {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 = {multiples of 4 between 10 and 25} and N = {even numbers between 11 and 23}, find M ∪ N

A. A.{12, 16, 20}
B. {14, 18, 22}
C. {12, 14, 16, 18, 22}
D. {12, 14, 16, 18, 20, 22, 24}

4. What is the place value of 7 in 24.376 ?

A. Unit
B. Ten
C. Tenth
D. Hundredt

5. Find the Highest Common Factor of 24, 42 and 72

A. 4
B. 6
C. 7
D. 1

6. By how much is $\left(4\frac{2}{3}+2\frac{1}{2}\right)$ greater than $\left(\frac{1}{4}+2\frac{1}{2}\right)$

A. $2\frac{1}{2}$
B. $4\frac{1}{12}$
C. $\frac{1}{12}$
D. 3

7. If p × q × r = 1197, and p = 19, q = 3, find r

A. 21
B. 49
C. 57
D. 61

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

A. 10
B. 11
C. 12
D. 13

9. Divide 1.612 by 0.4

A. 4.3
B. 4.03
C. 0.403
D. 0.43

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

1

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. GHC132,000.00

15. What is the value of x if $10^x = 1000$?

A. 1

B. 2

C. 3

D. 4

16. Express 625.13 in standard form

A. 6.2513×10^{-2}

B. 6.2513×10^{-4}

C. 6.2513×10^{2}

D. 6.2513×10^{4}

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

A. 8

B. 12

C. 14.5

D. 15.

18. 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 ?

2

A. $\frac{2}{3}$

B. $\frac{2}{5}$

C. $\frac{3}{10}$

D. $\frac{1}{2}$

19. Expand (2x + y) (2x - y)

A. $2x^2 – y^2$

B. $4x^2 – y^2$

C. $2x^2 + 4xy – y^2$

D. $4x^2 + 4xy – y^2$

20. Find the value of n, if 25.003 = (2 × 10) + (5 × 1) + (3 × n)

A. 0.001

B. 0.011

C. 0.01

D. 0.1

21. Evaluate $(3m)^2 – 3m^2$, when m = 2.

A. 12

B. 18

C. 20

D. 24

22. 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

23. Find the value of m, if 4(m + 4) = – 8.

A. – 6

B. – 2

C. 2

D. 6

24. Find the rule for the following mapping

x	1	2	3	4	5
↓	↓	↓	↓	↓	↓
y	1	4	9	16	25

A. $y \rightarrow x+2$

B. $y \rightarrow 2x$

C. $y \rightarrow x^2$

D. $y \rightarrow 2x+2$

25. How many vertices has a cuboid?

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

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

A.14,400 m^2 B. 15,400 m^2

B.16,400 m^2 C. 18,000 m^2

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

A. Isosceles triangle

B. Scalene triangle

3

C. Equilateral triangle
D. Right-angle triangle

28. At eight o'clock, which of the following is the angle between the hour and the minute hands of the clock?
A. 150°
B. 120°
C. 90°
D. 60°

29. A rectangular field 50 m wide and y m long requires 260 m of fencing. Find y.
A. 15 m
B. 40 m
C. 80 m
D. 105 m

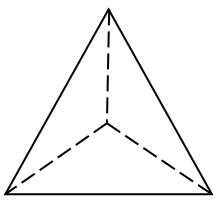
30. Which of the following best describes the statement: '*The locus of a point which moves so that its distance from two fixed points are always equal*'?
A. Bisector of an angle
B. Perpendicular bisector
C. Circle
D. Two parallel lines

31. Find the gradient of the equation of the straight line, $3x - 4y = 6$.
A. $\frac{3}{2}$
B. $\frac{3}{4}$
C. $-\frac{3}{4}$
D. 2

32. The bearing of A from B is 060°. Find the bearing of B from A
A. 90°
B. 120°
C. 240°
D. 360°

33. Given that vectors **u** = $\begin{pmatrix}-3\\5\end{pmatrix}$ and **v** = $\begin{pmatrix}2\\-3\end{pmatrix}$, find 2**v** – **u**
A. $\begin{pmatrix}1\\-1\end{pmatrix}$
B. $\begin{pmatrix}-1\\1\end{pmatrix}$
C. $\begin{pmatrix}-7\\-11\end{pmatrix}$
D. $\begin{pmatrix}7\\-11\end{pmatrix}$

34. What is the name of the figure above?



A. Cuboid
B. Kite
C. Triangle
D. Pyramid

4

35. The ratio of boys and girls in a school of 120 students are 3:x, if there are 50 girls in the school, find the value of x.

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

Use the table below to answer question 36 to 39

Mass(kg)	1	2	3	4	5	6	7	8	9
frequency	5	6	2	8	7	10	2	1	3

36. What is the range?

A. 8
B. 7
C. 9
D. 10

37. Find the modal mass

A. 9
B. 6
C. 5
D. 8

38. What is the median mass?

A. 2kg
B. 3kg
C. 5kg
D. 7kg

39. What is the chance of meeting at most 5kg

A. $\frac{7}{12}$
B. $\frac{7}{11}$
C. $\frac{5}{11}$
D. $\frac{6}{11}$

40. Evaluate $\left(\left(\frac{3}{5}\right)^{-2}\right)^{-1}$

A. $\frac{9}{5}$
B. $\frac{9}{25}$
C. $\frac{8}{25}$
D. $\frac{7}{25}$

DAS B.E.C.E PERFORMANCE BOOSTER

MARKING SCHEME: *MATHEMATICS*

QUESTION 1

(a) Fraction spent		Fraction left
Cassava cultivation	$^1/_4$	$1 - {}^1/_4 = {}^3/_4$
Maize farm	$^1/_5$	$1 - {}^1/_5 = {}^4/_5$
Cocoa farm	$^1/_6$	$1 - {}^1/_6 = {}^5/_6$

Total fraction left for sugar can form

$= {}^3/_4 \times {}^4/_5 \times {}^5/_6 = {}^3/_6 = {}^{\mathbf{1}}/_{\mathbf{2}}$ **…… [A1 mark]**

Let fraction of sugar cane = acres of sugar cane

Total fraction = X …… [M1 mark]

- $^1/_2 = 100$

  1 = X

- $\frac{1}{2}$X = 100 ……..[B1 mark]

  X = 2 × 100 = **200 acres …….. [A 2marks] TOTAL 5 MARKS**

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

= $\frac{x-4}{4} + \frac{5}{2} = 2x + 4 - 4$ …….. [M1]

= $\frac{x-4}{4} + \frac{5}{2} = 2x$

= $4 \times \frac{x-4}{4} + 4 \times \frac{5}{2} = 4 \times 2x$ ……. [B1]

= $x - 4 + 2 \times 5 = 8x$…….[M ½]

= $x - 4 + 10 = 8x$ ……[M ½]

= $x + 6 = 8x$

= $6 = 8x - x$ ……. [B 1/2]

= $6 = 7x$

= $\frac{6}{7} = \frac{7x}{7}$

- $\mathbf{x = \frac{6}{7}}$ **…….. [A1], TOTAL 5MARKS**

(c) Red balls = 5 Black balls = 9 Green balls = X

Total balls = 5 + X + 9 = 14 + X ……. [B ½]

6

Probability of black ball = $\frac{9}{20}$

(i) p(black) = $\frac{n(black)}{Total\ balls}$ …… [M1/2]

= $\frac{9}{20} = \frac{9}{14+x}$……[M ½]

14 + X = 20

X = 20 – 14 ……[.B ½]

X = 6 **…… [A ½]**

(ii) p(red) = $\frac{n(red)}{Total}$ …….. [M ½]

= $\frac{5}{14\ +x}$……[B ½]

= $\frac{5}{20}$……[B ½]

= $\frac{1}{5}$ **……. [A1] , TOTAL 5MARKS**

QUESTION 1; 5+5+5 = 15 MARKS

QUESTION 2

$A = 25 \times 10^{-3}, B = 5 \times 10^{-4}, C = 45 \times 10^{-2},\ D = 35 \times 10^{-5}$

$\frac{DC}{AB} = \frac{35\times10^{-5}\times45\times10^{-2}}{25\times10^{-3}\times5\times10^{-4},}$……M ½

$= \frac{35\times45\times10^{-5}\times10^{-2}}{25\times5\times10^{-3}\times10^{-4},}$…….. B ½

$= \frac{35\times45\times10^{-7}}{25\times5\times10^{-7},}$……M ½

$= \frac{7\times9\times10^{-7}}{5\times1\times10^{-7},}$……B ½

$= \frac{63\times10^{-7}}{5\times10^{-7},}$……M ½

$= 12.6 \times 10^{-7+(-7)}$……B ½

$= 12.6 \times 10^{0}$……M ½

$= 12.6$……A 1 ½…….5marks

(b) $\frac{5t}{y} = \frac{2}{t}$

$5t^2 = 2y$……M 1 ½

$\frac{5t^2}{2} = \frac{2y}{2}$……B 1 ½

$y = \frac{5}{2}t^2$……A2….5marks

7

(c) $R = Pi^2$, P =GH₵1200, $i = 10$

$R = 1200 \times 10^2$……M 1 ½

$R = 1200 \times 10 \times 10$……..B 1 ½

$R = GH₵120000$……..A2……5marks

TOTAL =15MARKS

QUESTION 3

(a) Principal amount = GH₵12000.00

Time = 5 years

Interest = 10%

(i) Total amount = P + I

Amount = P + $\frac{P \times R \times T}{100}$……..[B ½]

= 12000 + $\frac{12000 \times 5}{100}$ ……. [M ½]

Amount = 1200 +($120 \times 10 \times 5$)……[B ½]

= 12000 + 6000……[M ½]

= GH₵18000.00……..[A1]

Total amount = **GH₵18000.00**

(ii) Yearly installment = $\frac{A}{T} = \frac{18000}{5}$ ……. [B1]

= **GH₵3600 …….. [A1]**

TOTAL (a) 5 marks

(b) Price of TV = GH₵500.00, Discount rate = 10%..... [M1]

(i) Discount = $^{10}/_{100} \times 500$ …… [B1]

Discount = GH₵50.00 …… [A1]

(ii) New price of TV = 500 - 50 = **GH₵450.00 …….. [B1 A1]…..5marks**

(c) Commission = 10%

Total sales = GH₵10,000.00 ……. [B1 ½]

Commission =$\frac{10}{100} \times 10000$……..[M1 ½]

Commission =GH₵1000.00……..[A2]…….5MARKS

8

TOTAL MARKS 15

QUESTION 4

(a) (i) radius = 7, Q = θ

Length of arc = 11cm

Leth of arc = $\frac{\theta}{360} \times 2\pi r$ …….. [M ½]

11 = $\frac{\theta}{360} \times 2 \times \frac{22}{7} \times 7$ …… [B ½]

11 = $\frac{\theta}{360} \times 44$…….[M ½]

11 = $\frac{44Q}{360}$……..[B ½

$11 \times 360 = 44Q$

$\frac{11 \times 360}{44} = \frac{44Q}{44}$……..[M ½]

Q = 90^0 …….. [A 1]

(ii) Area of sector OAB = $\frac{\theta}{360} \times \pi r^2$ …… [M ½]

= $\frac{90}{360} \times \frac{22}{7} \times 7 \times 7$ …… [B1]

= $\frac{1 \times 22 \times 7}{4}$…….[M ½]

= $\frac{154}{4}$……..[B ½]

Area of sector = **$38.5cm^2$ …….. [A1] TOTAL 7 MARKS**

(b) TABLE……. [3MARKS]

Time	Tally	Frequency	F (t)
1	////	4	4
2	~~////~~ //	7	14
3	~~////~~ ~~////~~ /	11	33
4	~~////~~ //	7	28
5	~~////~~	5	25
6	///	3	18
7	//	2	14
8	//	2	16
9	///	3	27
		$\sum f = 44$	$\sum ft = 179$

(i) Average time = $\frac{\sum ft}{\sum f}$ …….. [M1]

9

$= \frac{179}{44}$ …… [B1]

$= 4\frac{3}{44}$ …….hours [A2]

(ii) The time with most student is 3 hours, with 11 students …….. [A1] …. TOTAL 15MARKS

QUESTION 5

(a) $D_A = (200 + t^2)$ km

- $D_B = (100 + 2t^2)$ km

(i) At the point of meeting

- $D_A = D_B$ …… [M ½]
- $200 + t^2 = 100 + 2t^2$ …….. [B ½]
- 200 – 100 = $2t^2 - t^2$……..[M ½]

100 = t^2

- $10^x = t^x$

t = 10 hours ……. [A ½]……..2MARKS

(ii) $D_A = 200 + 1(10)^2$

= 200 + 1 (100)……. [M ½]

= 200 + 100……..[B ½]

= **300 km ……. [A 1]……2MARKS**

- $D_B = (100 + 2t^2)$ km

= 100 + $2(10)^2$…….[M ½]

= 100 + 200……[B ½]

= **300 km …… [A1]**

Total distance = $D_A + D_B$

= 300 +300

= **600 km …….. [A1]…….3MARKS**

(iii) Average speed = $\frac{Total\ distance}{Time}$ ……. [M1]

= $\frac{600\ km}{10\ hours}$

Average speed = **60km/h ……. [A1]…….2MARKS**

(b) mn + 3np + 5m + 15P

= (mn + 3np) + (5m +15P) ……. [M1]

= ^{10} n(m + 3P) + 5(m + 3P) …… [B1]

= **(m + 3P) (n +5) ……. [A1]…….3MARKS**

(c) A = P(1 + RT)

A = P + PRT …… [M1]

A – P = PRT

- $\frac{A-P}{PT} = \frac{PRT}{PT}$

- $\frac{A-P}{PT} = R$

R = $\frac{A-P}{PT}$ …… [A1]

P = 1000, A = 20000 T = 2

R = $\frac{20000-1000}{1000 \times 2}$ …… [M ½]

= $\frac{19000}{2000}$

= **9.5** …… [A ½] …… TOTAL 15 MARKS

QUESTION 6

(a) Curved surface Area = $88cm^2$

(i) h = 2r , $\pi = \frac{22}{7}$

Curved Surface Area = $2\pi rh$ ……. [M ½]

$88 = 2 \times \frac{22}{7} \times r \times 2r$ [M ½]

$88 = \frac{44 \times 2r^2}{7}$ [B ½]

$88 = \frac{88r^2}{7}$

$88 \times 7 = 88r^2$

$\frac{88 \times 7}{88} = \frac{88r^2}{88}$ [B ½]

$7 = r^2$

$\sqrt{7} = \sqrt{r^2}$

r = $\sqrt{7}$cm …….. [A1]

(ii) height = 2r = $2 \times \sqrt{7} = 2 \times \sqrt{7}cm$ …….. [B1, A2]

(ii) Volume = $\pi r^2 h$ …… [M1]

11

$= \frac{22}{7} \times \sqrt{7}^2 \times 2 \times \sqrt{7}$ …… [B1]

$= \frac{22 \times 7 \times 2 \times \sqrt{7}}{7}$

$= \mathbf{44 \times \sqrt{7} cm^3}$ **……** **[A1]**

(b) Volume = $44 \times \sqrt{7} cm^3$

h = 22cm

Length of cuboid = 2W

Width = W

Volume = $L \times W \times h$ ……. [M1]

$\mathbf{44 \times \sqrt{7} cm^3} = 2W \times W \times 22$

$\mathbf{44 \times \sqrt{7} cm^3} = 44W^2$

- $\frac{44 \times \sqrt{7}}{44} = \frac{44W^2}{44}$ …… [M1]

$\sqrt{7} = W^2$

- **W = 7cm ……..** **[A1]**
- **L=2W = 2× 7 = 14cm ……. [B1, A2] TOTAL 15 MARKS**

PAPER 1

1. A
2. D
3. D
4. D
5. B
6. B
7. A
8. B
9. B
10. C
11. C
12. C
13. A
14. B
15. C
16. C
17. C
18. B
19. B
20. A
21. D
22. C
23. A
24. C
25. C
26. B
27. C
28. B
29. C
30. B
31. B
32. B
33. D
34. D
35. B
36. C
37. B
38. C
39. B
40. B

DAS BECE BOOSTER
MATHEMATICS
Essay and Objective
2 hours

2&1

NAME……

INDEX NUMBER ……....

DAS B.E.C.E PERFORMANCE BOOSTER

BASIC EDUCATION CERTIFICATE MOCK

2 hours

MATHEMATICS 2&1

*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, on 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 45 minutes.

The use of calculators is not allowed.

PAPER 2 [60 MARKS] 1HOUR

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.*

Question 1

a) Given that *P, R* and *W* are sets such that, P and R, are subsets of W

W={natural numbers greater or equal 3 but less than 21}

P={multiples of 3}

R ={factors of 18}

i. Find the elements of sets P, R and W

ii. Find (α) P^1 (β) $(P \cap R)^1$

b) Simplify $\left(3\frac{1}{15} - 2\frac{1}{3}\right) \div \left(2\frac{2}{15} + 1\frac{2}{3}\right)$

c) In a school, $\frac{1}{6}$ of the students speak French, $\frac{2}{3}$ of the school speak Ga and the rest speak Twi. If 60 students speak Twi, how many students are in the school

Question 2

a) Given that $\frac{\mathbf{3p+4q}}{\mathbf{2p+3q}} = \frac{\mathbf{4}}{\mathbf{5}}$, solve for $\frac{q}{p}$

b) Simplify $\frac{\mathbf{2x-3y}}{\mathbf{18}} - \frac{\mathbf{x-y}}{\mathbf{3}}$

c) A trader bought 21 mobile phones, 3 for GH₵300.00. If 3 of the phones got missing and the rest sold at 3 for GH₵400.00. Calculate the profit made by the trader

Question 3

a) Using a ruler and a pair of compasses only, construct triangle PQR such that, $|PQ| = |PR| = |QR| = 9cm$ and angle $< PQR = < RPQ = < QPR$

b) Construct a line equidistant from $|PQ|\ and\ |QR|$

c) Construct a line equidistant from $|PR|$

d) Locate the intersection of (b) and (c) O, with centre O, construct a path equidistant from the center O, touching $|PQ|, |PR|, and\ |QR|$

Question 4

The data below represents marks obtained by students in a test.

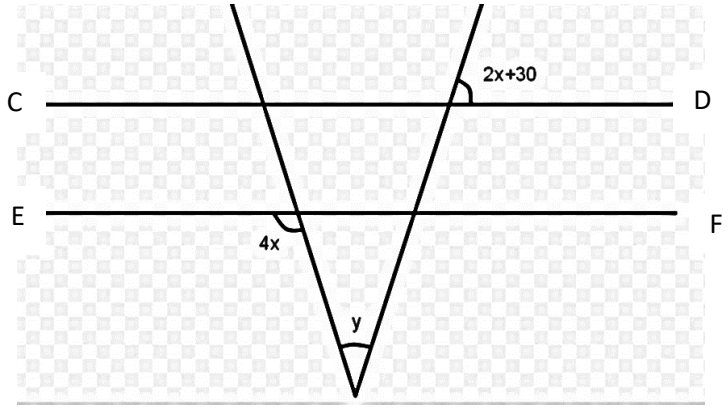
3, 4, 5, 5, 1, 1, 1, 2, 2, 2, 6, 6, 7, 7, 8, x, x, 5

2, 3, 4, 5, x, 2, 3, 2, 7, 8, 8, 3, 3, 4, 4, 5, 6, 3

a) Construct a frequency table for the data
b) Find an expression for $\sum f\,x$
c) Find the express for mean, hence find the value of x into the nearest whole if mean is 5 marks
d) Find the mode and the median

Question 5

a) In the diagram, CD and EF are transversal lines and are parallel.



Find the value of x and y

b) A cuboid of length, width and height 12cm, Wcm and 10cm respectively, if the volume is $600cm^3$. Find the width(Wcm) of the cuboid

c) Solve the equation $\frac{2t}{15} = \frac{3t}{5} - \frac{t}{3} + 1$

Question 6

a) The table below represents a relationship between x and y such that $y = ax + b$

x	-3	-2	-1	0	1	2	3	4	5
y	-4	-1	2	5	8	11	14	17	20

i. Find the values of a and b using the table.
ii. What does a and b represent?
iii. Find the value of y when $x = 20$

b) Find the mid-point of the vector $a = \binom{3}{9}$ and $b = \binom{15}{21}$

c) Make T the subject in h

Answer **all** *questions.*

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

41. Which of the sets below is a infinite set

A. {2, 3, 5}

B. {6, 8,9,10,12,14,15}

C. {4, 6, 8, 9, 10, 12, 14, 15……}

D. {3, 6, 15}

42. Evaluate $\frac{8\times64\times2^{-2}}{2^5}$

A. 2^2

B. 2^{-2}

C. 2^3

D. 2^4

43. If R = {factors of 15} and N = {factors of 45}, find M ∩ N

A. {1, 3, 5, 20}

B. {1, 3, 5, 15}

C. {12, 14, 16, 18, 22}

D. {1, 3, 5, 15, 45}

44. Find the gradient connecting A(4,9) and B(6, 10)

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. 2

D. 3

45. Find the Highest Common Factor of 48 and 96

A. $2^5 \times 3$

B. $2^4 \times 3$

C. $2^4 \times 3^2$

D. $2^5 \times 3^3$

46. Express 2700 as the product of prime factors

A. $2^2 \times 3^3 \times 5^3$

B. $2^2 \times 3^3 \times 5^2$

C. $2^3 \times 3^3 \times 5^4$

D. $2^4 \times 5^2$

47. If $\overrightarrow{AB} = \begin{pmatrix}8\\7\end{pmatrix}$, Find the value of $\overrightarrow{BA}$

A. $\begin{pmatrix}8\\7\end{pmatrix}$

B. $\begin{pmatrix}-8\\-7\end{pmatrix}$

C. $\begin{pmatrix}-8\\7\end{pmatrix}$

D. $\begin{pmatrix}8\\-7\end{pmatrix}$

48. Find the side of a square whose perimeter is 48m

A. 10cm

B. 11cm

C. 5cm

D. 12cm

49. Multiply 0.0024 by 0.002 leaving your answer in standard form

A. 4.8×10^{6}

B. 4.8×10^{-6}

C. 4.8×10^{5}

D. 4.8×10^{-5}

50. Arrange the following fractions in descending order: $\frac{1}{10}, \frac{2}{5}, \frac{1}{4}$

A. $\frac{1}{10}, \frac{2}{5}, \frac{1}{4}$

B. $\frac{2}{5}, \frac{1}{10}, \frac{1}{4}$

C. $\frac{2}{5}, \frac{1}{4}, \frac{1}{10}$

D. $\frac{1}{10}, \frac{1}{4}, \frac{2}{5}$

51. Find x if $x: 3 = 18: 6$

A. 9

B. 8

C. 3

D. 6

52. 15 boys used 300hours to weed a parcel of land. How many boys can wee the same land in 150 hours?

A. 20 boys

B. 10 boys

C. 30 boys

D. 12 boys

53. A salesman was promised 10% commission on the total sales in a year. He made an average sale GH₵15000.00. Find his commission for the year

A. GH₵ 1800.00

B. GH₵ 18000.00

C. GH₵ 2000.00

D. GH₵ 180.00

54. The sales price of a shirt was GH₵ 120.00. If a discount of 10% was allowed. Find the discount

A. GH₵50.00

B. GH₵36.00

C. GH₵12.00

D. GH₵24.00

55. What number can be added to 94 to make it divisible by 20

A. 10

B. 6

C. 20

D. 15

56. Solve for t in $t^2 - 1 = 24$

A. 5

B. 6

C. 7
D. 8

57. Find the mean of 3, 3, 4, 5, 4, 5, 1, 1, 2, 2,2
A. 2
B. 3
C. 2.9
D. 2.8

58. Find an expression for the perimeter of a rectangle whose length and width are $(3x - 5)cm$ and $(x + 2)$cm respectively.
A. $(6x + 8)cm$
B. $(8x - 6)cm$
C. $(8x + 6)cm$
D. $(6x - 6)cm$

59. Expand $(3x - y - 2)(x + y)$
A. $3x^2 - 2x + 2xy - 2y - y^2$
B. $3x^2 + 2x + 2xy - 2y - y^2$
C. $3x^2 - 2x + 2xy + 2y - y^2$
D. $3x^2 + 2x + 2xy + 2y + y^2$

60. Express f in terms of h and g in $\frac{1}{h} = \frac{2g}{f}$
A. $f = \frac{3h}{g}$
B. $f = 3gh$
C. $f = 2gh$
D. $f = -2gh$

61. Evaluate $-35 - (-5 - 11 - 10)2$
A. -18
B. 18
C. -17
D. 17

62. A pen cost $GH¢1.50$ and a pencil cost $GH¢1.20$. What is the cost of 4pens and 5pencils?
A. GH¢10.00
B. $GH¢12.00$
C. $GH¢13.00$
D. $GH¢16.00$

63. Find the value of p, if $\frac{p^2-64}{p-8} = 0$
A. – 8
B. 8
C. 6
D. 12

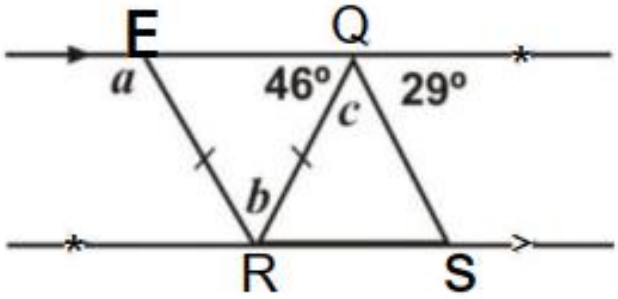
64. Find the value of 8 in the relation $y \to 2x^2 - 4$
A. 128
B. 120

C. 124
D. 100

65. Find the number of subsets in a set of five elements
A. 16
B. 32
C. 8
D. 4

66. Complete the sequence 1, 5, 13, 29 _, _,
A. 61, 125
B. 62, 120
C. 75, 150
D. 105, 210

Use the diagram to answer question 27 to 30



67. What is the value of $angle\ \boldsymbol{a}$
A. 134°
B. 46°
C. 102°
D. 128°

68. Find the value of angle $\boldsymbol{b}$
A. 80°
B. 46°
C. 88°
D. 96°

69. Find the value of $\boldsymbol{c}$ in the diagram
A. 100°
B. 105°
C. 102°
D. 46°

70. Find the height of a triangle of base 12cm and area $60cm^2$
A. $11cm$
B. $10cm$
C. $12cm$
D. $14cm$

71. How many element s are in the set $T = \{5 \geq T \geq 10\}$
A. 6
B. 5
C. 4
D. 7

72. Find the diameter of a circle whose circumference is 44m

A. 7m
B. 21m
C. 20m
D. 14m

73. Decrease GH₵50,000.00 by 15%

A. GH₵45,000.00
B. GH₵40,000.00
C. GH₵42,500.00
D. GH₵40,000.00

74. Solve the inequality $\frac{3}{y} - 3 \geq 5$

A. $y \leq \frac{3}{8}$
B. $y \leq \frac{3}{8}$
C. $y > \frac{3}{8}$
D. $y < \frac{3}{8}$

75. Simplify $\left(\frac{16}{25}\right)^{-\frac{1}{2}}$

A. $\frac{3}{5}$
B. $\frac{5}{4}$
C. $\frac{2}{5}$
D. $\frac{4}{5}$

76. If the product of three numbers is 396. Two of the numbers are 3 and 12, find the third number

A. 9
B. 11
C. 6
D. 8

77. Factorize completely $25x^2 - 9y^2$

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

78. Divide 12000 by 0.04

A. 3000
B. 300000
C. 300
D. 3

79. Evaluate $2\frac{1}{2} - 3\frac{1}{4} of \frac{3}{8}$

A. $1\frac{9}{32}$
B. $1\frac{9}{31}$
C. $2\frac{7}{32}$

D. $3\frac{1}{32}$

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

A. 12

B. 18

C. 20

D. 24

DAS BECE PERFORMANCE BOOSTER

MATHEMATICS MARKING SCHEME

PAPER 2

ANSWER FOUR QUESTIONS

QUESTION 1a

$W = \{3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$.....A1

$P = \{3, 6, 9, 12, 15, 18\}$.....A1

$R = \{3, 6, 9, 18\}$.....A1

QUESTION 1a(ii).

(α) $P^1 = \{4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20\}$.....A1

(β) $(P \cap R)^1$.

$R^1 = \{4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20\}$.

$(P \cap R)^1 = \{4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20\}$.....A1

TOTAL = 5MARKS

QUESTION 1b.

$\left(3\frac{1}{15} - 2\frac{1}{3}\right) \div \left(2\frac{2}{15} + 1\frac{2}{3}\right)$.

$=\left(\frac{46}{15} - \frac{7}{3}\right) \div \left(\frac{32}{15} + \frac{5}{3}\right)$.....M1

$=\left(\frac{1\times46-7\times5}{15}\right) \div \left(\frac{32\times1+5\times5}{15}\right)$.....B1

$=\left(\frac{46-35}{15}\right) \div \left(\frac{32+25}{15}\right)$.....B1

$=\frac{11}{15} \div \frac{57}{15}$.....M1

$=\frac{11}{15} \times \frac{15}{57}$

$=\frac{11}{57}$.....A1

TOTAL =5MARKS

QUESTION 1c.

Total fraction of students $= 1$, French $= \frac{1}{6}$, Ga $= \frac{2}{3}$, Twi = 60 students

Fraction of French and Ga $= \frac{1}{6} + \frac{2}{3} = \frac{1\times1+2\times2}{6} = \frac{1+4}{6} = \frac{5}{6}$.....M1

Fraction left(Twi) $= 1 - \frac{5}{6} = \frac{6-5}{6} = \frac{1}{6}$

Twi = Fraction left

Total = Total fraction B1

$60 = \frac{1}{6}$.

$x = 1$. Cross multiplying.....M ½

$1 \times 60 = \frac{1}{6}x$.

$60 = \frac{1}{6}x$.....M ½

$60 \times 6 = x$.....M1

$x = 360 = total\ students$.....A1

TOTAL = 5MARKS(QUESTION 1=15 MARKS)

QUESTION 2a.

$\frac{3p+4q}{2p+3q} = \frac{4}{5}$,

$5(3p + 4q) = 4(2p + 3q)$.....M1

$15p + 20q = 8p + 12q$.....B ½

$15p - 8p = 12q - 20q$.....B ½

$7p = -8q$.....M1

$\frac{7p}{7q} = \frac{-8q}{7q}$.....B 1

$\frac{p}{q} = \frac{-8}{7}$.....A1

TOTAL =5MARKS

QUESTION 2b.

$\frac{2x-3y}{18} - \frac{x-y}{3}$.

$= \frac{1(2x-3y)-6(x-y)}{18}$.....*M1*

$= \frac{2x-3y-6x+6y}{18}$.....*B1*

$= \frac{2x-6x-3y+6y}{18}$ ……M1

$= \frac{-4x+4y}{18}$ ……A2

QUESTION 2c.

Quantity of phones = 21, Cost price 3 for GH₵300.00

Total cost $= \frac{21}{3} \times 300 = \text{GH₵}2{,}100.00$ ……M1…..A1

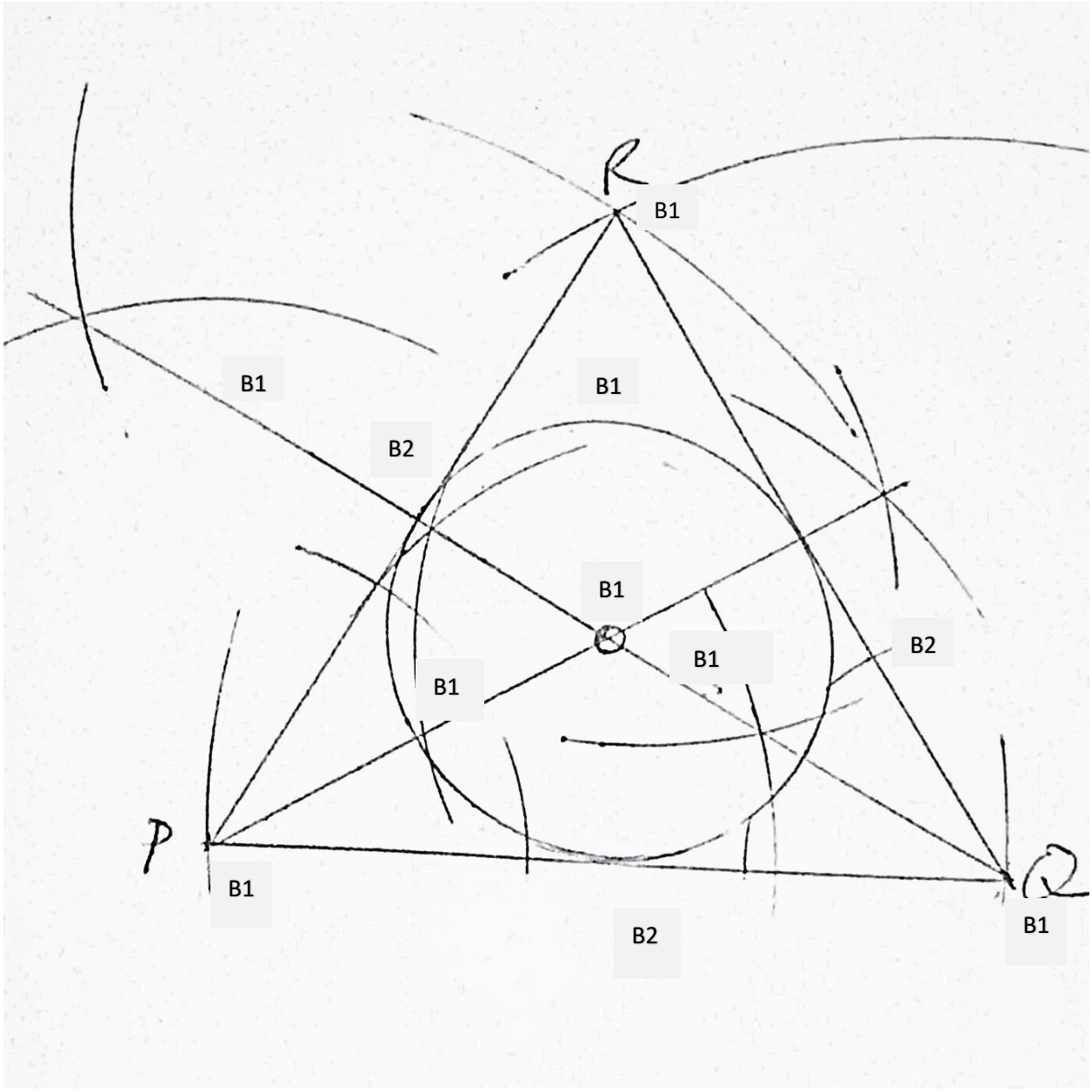
Unit price = 3 for GH₵400.00, Quantity = 21-3 = 18 phones

Total sales/revenue $= \frac{18}{3} \times 400 = \text{GH₵}2{,}400.00$ ……M1…A1

Profit = Total sales -Total cost

Profit $= \text{GH₵}2100.00 - \text{GH₵}2400.00 = \text{GH₵}300.00$ ……A1

QUESTION 3



TOTAL MARKS= 15MARKS

QUESTION 4a

Marks(x)	*tally*	*Frequency*	*fx*
1	*///*	*3*	*3*

2	*////*	*6*	*12*
3	*////*	*6*	*18*
4	*////*	*4*	*16*
5	*////*	*5*	*25*
6	*///*	*3*	*18*
7	*///*	*3*	*21*
8	*///*	*3*	*24*
x	*///*	*3*	*3x*
		$\sum f = 36$	$\sum fx = 3x + 137$

Frequency table……5marks

TOTAL = 5MARKS

QUESTION 4b.

$\sum fx = 3x + 137$……*A3*

TOTAL = 3MARKS

QUESTION 4c.

$\text{Mean} = \frac{\sum fx}{\sum f}$……*M1*

Mean $= \frac{3x+137}{36}$……*B1*

Mean = 5

$5 = \frac{3x+137}{36}$……*M ½*

$180 = 3x + 137$……*B ½*

$180 - 137 = 3x$…… *B ½*

$43 = 3x.$

$\frac{43}{3} = \frac{3x}{3}$……*M ½*

$x = 14.333$…… *A ½*

$x \approx 14$……*A ½*

TOTAL = 5MARKS

QUESTION 4d.

Mode is 2 and 3 marks……A1

Median position $= \frac{36}{2}$th and $(\frac{36}{2} + 1)$th = *18th and 19th position*

From the table the median is =4marks……A1= ***TOTAL = 2MARKS***

QUESTION 5a.

d) In the diagram, CD and EF are transversal lines and are parallel.

Angel 4x and 2x+30 is supplementary, the sum will be

180……M ½

$4x + 2x + 30 =$
180……M ½

$6x + 30 =$
180……..B ½

$6x = 180 -$
30…….. B ½

$6x = 150.$

$\frac{6x}{6} = \frac{150}{6}$.

$x = 25°$……A ½ ……..2 ½ MARKS

If $x = 25°$, 4x will be 100°, vertically opposite are equal it will be 100°, then the interior angle with the straight line will be 80°, also angle 2x +30 is alternate to angle on EF and it is vertically opposite the interior base angle of the triangle, so 2x + 30 = 2(25)+30 =80°

So the two bases of the triangle are 80°, therefore;

80+80+y = 180……M ½

160+y = 180…….. B ½

y=180-160……..M ½

y=20°……A 1

TOTAL = 2 ½ MARKS

QUESTION 5b.

Length = 12cm, width = wcm, height = 10cm

Volume = $600cm^3$……M 1

Volume
=LWH……M1

$12 \times 10 \times W =$
600……B1

$120W =$
600……M1

$\frac{120W}{120} = \frac{600}{120}$. =5cm , Width = 5cm……A1= 5MARKS

QUESTION 5c.

$\frac{2t}{15} = \frac{3t}{5} - \frac{t}{3} + 1$

$15 \times \frac{2t}{15} = \frac{3t}{5} \times 15 - \frac{t}{3} \times 15 + 1 \times 15$.....**M 1**

$2t = 3(3t) - t(5) + 15$.....B ½

$2t = 9t - 5t + 15$.....M ½

$2t - 9t + 5t = 15$.....M 1

$-2t =$
15.....M ½

$\frac{-2t}{-2} =$
$\frac{15}{-2}$.....M ½

$t =$
$-7\frac{1}{2}$.....A1

TOTAL = 5MARKS

QUESTION 6a(i)

Given $y = ax + b$, the co-efficient of x is the gradient, therefore we are finding gradient

$a = \frac{y_2 - y_1}{x_2 - x_1}$. From the table (4,17) and (5, 20).....M ½

$a = \frac{20-17}{5-1} = \frac{3}{1} = 3$.....B ½ ..A ½

From the relation $y = ax + b$, b is the y-intercept. It is the value of y when x =0, from the table when x=0, y=5, so the value of b is 5.....M ½ .....A ½ = **2 ½ Marks**

QUESTION 6a(ii)

From the relation $y = ax + b$, it will be y= 3x+5, a represent gradient and b represents the y-intercept

TOTAL = A 1 ½ marks

QUESTION 6a(iii)

When x=20, y=3(20)+5=60+5=65……A1

QUESTION 6b.

$a = \binom{3}{9}$ *and* $b = \binom{15}{21}$.

$midpoint = \frac{1}{2}(a + b)$……M1

$midpoint = \frac{1}{2}\left(\binom{3}{9} + \binom{15}{21}\right)$……..B ½

$midpoint = \frac{1}{2}\binom{3+15}{9+21}$…….. B ½

$midpoint = \frac{1}{2}\binom{18}{30}$……..M1

$midpoint = \binom{9}{15}$……M1

QUESTION 6c.

$\frac{5}{Q} + \frac{3}{T} = 2 - S.$

$QT \times \frac{5}{Q} + \frac{3}{T} \times QT = QT \times 2 - S \times QT$……M1

$5T + 3Q = 2QT - STQ$……..B ½

$5T - 2QT + STQ = 3Q$……B ½

$T(5 - 2Q + SQ) = 3Q$……M ½

$\frac{T(5-2Q+SQ)}{(5-2Q+SQ)} = \frac{3Q}{5-2Q+SQ}$……B1

$T = \frac{3Q}{5-2Q+SQ}$……A1

TOTAL = 5MARKS

PAPER 1

1. C
2. A
3. B
4. B
5. B
6. B
7. B
8. D
9. B
10. C
11. A
12. C
13. B
14. C
15. B
16. A
17. C
18. B
19. A
20. C
21. D
22. B
23. B
24. C
25. B
26. A
27. A
28. C
29. B
30. B
31. A
32. D
33. C
34. D
35. B
36. B
37. A
38. B
39. A
40. D