

0706024/2&1 B.B.E.K.O

June 2024

MATHEMATICS 2&1

Essay & Objective

2 hours

2 & 1

Name.....

Index Number.....

BEST BRAIN EXAMINATIONS KONSORTIUM GHANA

Special Private Mock Examinations For BECE Candidates

June 2024

MATHEMATICS 2 & 1

2 hours

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

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

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



**GHANA
EDUCATION
SERVICE**

ANLOGA DISTRICT COHBS MOCK

© 2024 Best Brain Examinations Konsortium
(020-7732900 / 0249273049)

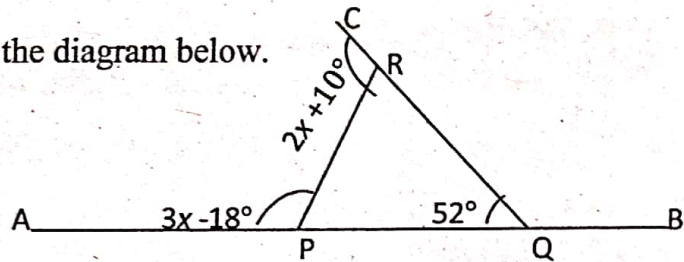
0706024 Mathematics 2&1 bbeko

Answer four questions only
All questions carry equal marks

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

1. (a) A, B, C and D are vertices of parallelogram ABCD. If the coordinates of A, B and C are A (1, 2), B (3, -1) and C (-1, -1), find
- the coordinates of D;
 - $\frac{AC}{AC}$

- (b) (i) Find the value of x in the diagram below.



- (ii) Simplify $\left(\frac{3}{5} + 1\frac{1}{2}\right) \div \frac{1}{4} \times 3\frac{1}{3}$

- (c) (i) Make m the subject of the formula $t = \frac{a-m}{1+am}$
(ii) If $t = 8$ and $a = 3$, in 1(c) (i) above, find the value of m.
- (d) (i) Given that $\sqrt{2} = 1.4142$, find the value of $\sqrt{32}$, correct to 3 significant figures.
(ii) Simplify the surd: $\sqrt{18} - \frac{2}{\sqrt{2}}$

2. (a) Kuma cultivated 1.235 acres of land more than Anokye and Hamidu also cultivated 0.537 acres more than Kuma. If the total acres of land cultivated by the three is 19.057, find and correct to 1 decimal place, the acres of land cultivated by

- Anokye;
- Hamidu.

- (b) (i) Given that $r = \begin{pmatrix} 4a \\ 3 \end{pmatrix}$, $q = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$ and $r \cdot q = -2$. Find the value of a
(ii) Factorize completely $4mn + 4m - n - 1$

- (c) (i) If the price of a calculator which is GH¢ 150.00 depreciates by 4% annually, find the new price after 1 year.

- (ii) If $g = \frac{5r+4}{4r-2}$, find the value of g if $r = 4$ and r if $g = 4$.

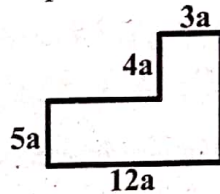
- (d) Rationalize $\frac{\sqrt{2}+\sqrt{5}}{\sqrt{10}}$

3. (a) Using a scale of 2cm to 1 unit on both axes, draw two perpendicular lines OX and OY on a graph sheet. Mark the x-axis from -5 to 5 and the y-axis from -6 to 6. On the same graph sheet, plot indicating all the coordinates of all the vertices:

- rectangle PQRS with P(1,1), Q(5,1), R(5,3) and S(1,3).
- the image $P_1Q_1R_1S_1$ of rectangle PQRS under a 180° rotation about the origin, where $P \rightarrow P_1$, $Q \rightarrow Q_1$, $R \rightarrow R_1$ and $S \rightarrow S_1$
- the image $P_2Q_2R_2S_2$ of rectangle PQRS using the x-axis as a mirror line, where $P \rightarrow P_2$, $Q \rightarrow Q_2$, $R \rightarrow R_2$ and $S \rightarrow S_2$

(iv) the image $P_3Q_3R_3S_3$ of rectangle $PQRS$ using the y -axis as a mirror line, where $P \rightarrow P_3, Q \rightarrow Q_3, R \rightarrow R_3$ and $S \rightarrow S_3$

- (b) Find the sum of 2.48, 3.65, 701.532 and 102.7 leaving your answer to one decimal place.
- (c) Find an expression for the perimeter of the figure below.



4. (a) (i) A coconut vendor sells 120 pieces of coconuts a day. If he works 6 days in a week, find the total number of coconuts he can sell in 40 weeks, expressing the answer in standard form.
- (ii) Find $0.00182 \div 0.00013$, leave the answer in standard form.
- (b) Towns **A**, **K** and **P** are to build a common clinic. The distance from town **A** to town **P** is 16km, from town **P** to town **K** is 18km and town **A** to town **K** is 20km. Using a pair of compasses and a ruler only, construct a triangle of the three towns, using a scale of $2\text{km} = 1\text{cm}$. Mark a point in the triangle to show where the clinic could be built.
- (c) In a survey of 50 students, it was found that 30 students like playing basketball and 25 students like playing football. If 12 students like both basketball and football, answer the following questions:
- (i) Represent the given information using a Venn diagram.
- (ii) How many students like only basketball?
- (iii) How many students like only football?
- (iv) How many students like neither basketball nor football?
- (d) Simplify $\sqrt{6\frac{2}{3} \div (3\frac{4}{15} - 1\frac{3}{5})}$

5. (a) The data below shows the number of minutes spent by some patients at a certain hospital on a given day.

56	42	33	32	60	48	47	54	39	51
48	31	50	46	35	42	53	55	37	49
60	31	51	47	37	31	58	49	34	51

- (i) Copy and complete the frequency distribution table below for the data above.

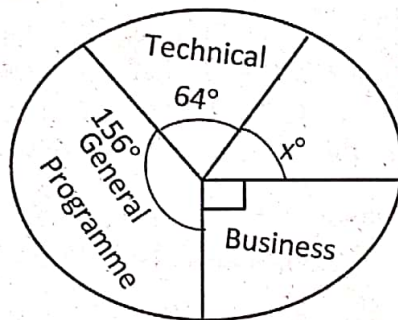
Minutes (s)	Tally	Frequency	Class Boundaries
31 – 35			
36 – 40			
41 – 45			
46 – 50			
51 – 55			
56 – 60			

Turn over

- (ii) Draw a histogram for the data
- (iii) Use the histogram to find the modal minutes
- (iv) Find the median class.

- (b) Given that $5^{y+1} = \sqrt{5}$, find the value of y .
- (c) Find the mean of $3y, 3y, 10y, 2y, 8y, 4y$
- (d) Express the days in the month of January in seconds, leaving the answer in standard form.

6. (a) The pie chart shows angles representing the number of candidates who applied for admission into four programmes at a Senior High School. The number of pupils who applied were 1,080.

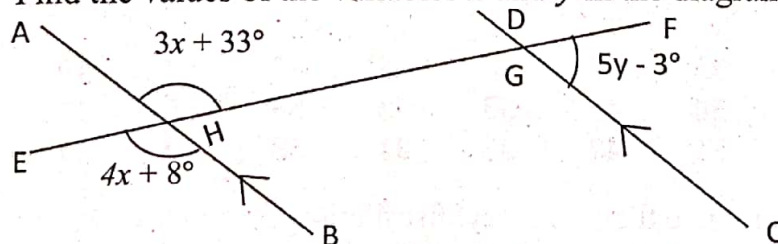


Find;

- (i) The angle x representing the vocational programme.
- (ii) The number of candidates who applied for Business Programme.
- (iii) Correct to the nearest whole number the percentage of the number of applicants who applied for General Programme.

- (b) Evaluate $\left[1\frac{1}{2} + \left(\frac{2}{3}\right) \div \left(5 - \frac{3}{8}\right)\right]$

- (c) Find the values of the variables x and y in the diagram below.



- (d) Factorize completely;
- (i) $mp + np - mt - nt$
 - (ii) $2xy - 8x + 3y - 12$

END OF ESSAY TEST

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

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

**PAPER 1
OBJECTIVE TEST**

1 hour

Answer all the questions on your Objective Test answer sheet.

1. Use 2B pencil throughout
2. On the pre-printed answer sheet, check that the following details are **correctly** printed:
Your **surname** followed by your **other names**, the *Subject Name*, your *Index Number*,
Centre Number and the *Paper Code*.
3. In the boxes marked *Candidate Number*, *Centre Number* and *Paper Code*, **reshade** each of the shaded spaces.
4. An example is given below. This is for a candidate whose name is winner Seyram BABANAWO. Her index number is 772384188 and she is writing the examination at Centre Number 77234. She is offering Mathematics 1 and the Paper Code is 4510.

**BEST BRAIN EXAMINATION KONSORTIUM
SPECIAL PRIVATE MOCK FOR BECE CANDIDATES
OBJECTIVE ANSWER SHEET.**

CANDIDATE NAME: BABANAWOSEYRAM WNNER	SUBJECT: MATHEMATICS
---	---------------------------------------

1. Use HB Pencil Press firmly 2. Answer each question by choosing one letter and then, shade through the letter chosen like this [A] [B] [C] [D] [E] 3. If you want to change an answer, rub out your	4. First mark completely If only four alternative answers are given for each question, ignore the letter E 5. Your question paper may have fewer than 60 Questions.
--	---

CANDIDATE NUMBER									
7	7	2	3	8	4	1	8	8	
[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	
[1]	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[1]	
[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	
[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	
[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	
[5]	[5]	[5]	[5]	[5]	[5]	[5]	[5]	[5]	
[6]	[6]	[6]	[6]	[6]	[6]	[6]	[6]	[6]	
[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	
[8]	[8]	[8]	[8]	[8]	[8]	[8]	[8]	[8]	
[9]	[9]	[9]	[9]	[9]	[9]	[9]	[9]	[9]	

CENTRE NUMBER				
7	7	2	3	4
[0]	[0]	[0]	[0]	[0]
[1]	[1]	[1]	[1]	[1]
[2]	[2]	[2]	[2]	[2]
[3]	[3]	[3]	[3]	[3]
[4]	[4]	[4]	[4]	[4]
[5]	[5]	[5]	[5]	[5]
[6]	[6]	[6]	[6]	[6]
[7]	[7]	[7]	[7]	[7]
[8]	[8]	[8]	[8]	[8]
[9]	[9]	[9]	[9]	[9]

PAPER CODE			
4	5	1	0
[0]	[0]	[0]	[0]
[1]	[1]	[1]	[1]
[2]	[2]	[2]	[2]
[3]	[3]	[3]	[3]
[4]	[4]	[4]	[4]
[5]	[5]	[5]	[5]
[6]	[6]	[6]	[6]
[7]	[7]	[7]	[7]
[8]	[8]	[8]	[8]
[9]	[9]	[9]	[9]

For Supervisors Only.

If candidate is absent shade this space



© 2024 Best Brain Examinations Konsortium
(020-7732900 / 0249273049 /)

Answer all questions

Each question is followed by four options A to D. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question. An example is given below.

What is the smallest number which is divisible by 16 and 20?

- A. 80
- B. 40
- C. 120
- D. 160

The correct answer is 80, which is lettered A and therefore answer space A would be shaded.

☒ A

☐ B

☐ C

☐ D

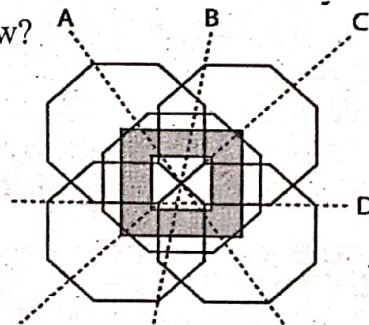
Think carefully before you shade the answer spaces. Erase completely an answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions

1. Which line is a line of symmetry for the design below?

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

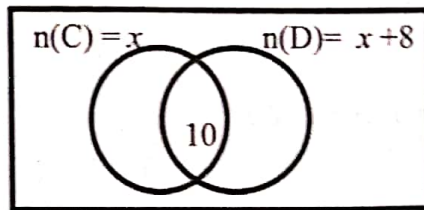


2. If Dan earns GH¢ 8.50 per hour, find the least period he must work to earn more than GH¢ 408.00
- A. 49 hours
 - B. 56 hours
 - C. 61 hours
 - D. 67 hours

Two tables and three chairs together cost GH¢2000 whereas three tables and two chairs together cost GH¢ 2,500. Use this information to answer questions 3 and 4.

3. What is the unit cost of a table?
- A. GH¢ 500. 00
 - B. GH¢ 700. 00
 - C. GH ¢ 800. 00
 - D. GH¢ 600.00
4. Each chair costs
- A. GH¢ 500.00
 - B. GH¢ 300.00
 - C. GH¢ 200.00
 - D. GH¢ 250. 00

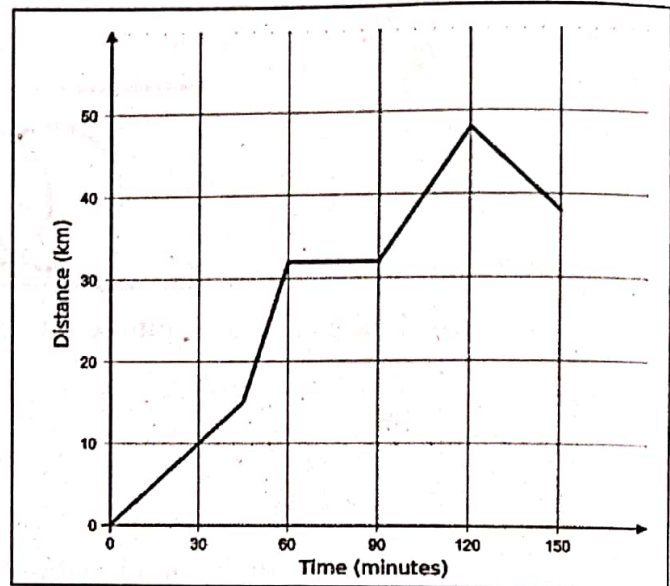
The study of Chinese or Dutch or both by a group of 50 students is shown in the Venn diagram below. Every student studies at least one of the two languages. The number of students studying Dutch is 8 more than the number of students studying Chinese. Use this to answer Questions 5 and 6.



5. How many students study Chinese but not Dutch?
 A. 10
 B. 16
 C. 24
 D. 40
6. How many students study Dutch but not Chinese?
 A. 24
 B. 40
 C. 10
 D. 34
7. Express 0.0043216 in standard form.
 A. 4.3216×10^{-4}
 B. 4.3216×10^{-3}
 C. 4.3216×10
 D. 4.3216×10^3
8. Find the missing numbers in the sequence 9800750, 9800200, 9799650, ____, 9798550.
 A. 9,789,550
 B. 9,798,550
 C. 9,799,100
 D. 9,719,100
9. The numbers of hours worked per week by 400 workers are shown below in the table below. What percentage of them worked 19 hours or less?
- | Number of hours | Frequency |
|-----------------|-----------|
| 0 - 9 | 20 |
| 10 - 19 | 80 |
| 20 - 29 | 200 |
| 30 - 39 | 100 |
- A. 20%
 B. 25%
 C. 75%
 D. 80%
10. Simplify $2\sqrt{18} - 3\sqrt{72} + 3\sqrt{50}$, leaving your answer as a surd.
 A. $3\sqrt{2}$
 B. $4\sqrt{2}$
 C. $-3\sqrt{2}$
 D. $-4\sqrt{2}$

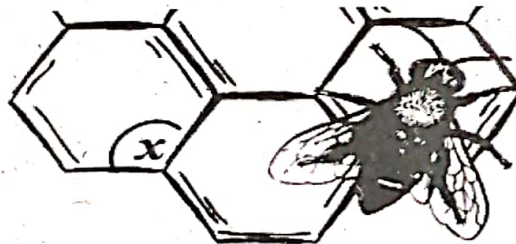
Turn over

The graph below shows the first 150 minutes of the distance covered by a cyclist away from home. Use the graph to answer questions 11 and 12.



11. How far did she travel in the first 150 minutes?
 A. 45 km
 B. 32 km
 C. 38 km
 D. 74 km
12. For how long was she stationary?
 A. 30 minutes
 B. 60 minutes
 C. 90 minutes
 D. 120 minutes
13. Evaluate 0.25×0.006 correct to three decimal places.
 A. 0.001
 B. 0.002
 C. 0.015
 D. 0.075
14. The table below shows the number of pencils and the corresponding number of erasers needed in your class cupboard. What is the rule that relates the number of pencils to the number of erasers?
- | | | | | |
|-------------------|----|----|----|----|
| Number of pencils | 5 | 10 | 15 | 20 |
| Number of erasers | 10 | 20 | 30 | 40 |
- A. Number of erasers = Number of pencils + 5
 B. Number of erasers = $2 \times$ Number of pencils
 C. Number of erasers = Number of pencils $\div 2$
 D. Number of erasers = Number of pencils - 5
15. There are p counters in a bag. 12 of the counters are yellow. Hafiz takes at random 30 counters from the bag. 5 of these counters are yellow. Estimate the value of p .
 A. 84
 B. 60
 C. 48
 D. 72
16. Which of the following fractions is equivalent to 40%?
 A. $\frac{2}{5}$
 B. $\frac{3}{5}$
 C. $\frac{4}{5}$
 D. $\frac{5}{5}$

17. I gave a storekeeper a GH¢10.00 note for goods I bought. He asked me for another 15Gp for ea of change. If he then gave 50Gp, how much did I pay for the goods?
- GH¢9.35
 - GH¢9.45
 - GH¢9.65
 - GH¢10.65
18. If $n^2 + 1 = 50$, find n
- 7
 - 24.5
 - 25
 - 49
19. Divide 64.5 by 0.015, leaving the answer in Standard form.
- 4.3×10^4
 - 4.3×10^3
 - 4.3×10^2
 - 4.3×10
20. Simplify $\frac{2(u-v)(2u+3v)}{4u+6v}$
- $\frac{(u-v)(2u+v)}{(u+v)}$
 - $\frac{(u-v)(u+v)}{(u+2v)}$
 - $\frac{1}{2}(u-v)$
 - $(u-v)$
21. Simplify $3(5a^2 + 2c) - 2a(1 - 3a) - 6c$
- $21a^2 - 2a - 6c$
 - $13a^2 - 2a - 12c$
 - $3a^2 - 2a$
 - $21a^2 - 2a$
22. Factorize: $kx + 2xt - 4k - 8t$
- $(k - 2t)(x + 4)$
 - $(k + 2t)(x + 4)$
 - $(k + t)(x - 4)$
 - $(k + 2t)(x - 4)$
23. Each side of the honeycomb below has all sides equal. Find the value of the angle marked x .
- 60°
 - 90°
 - 120°
 - 150°



Turn over

24. If $y = \frac{x+8}{x-4}$ find the value of y when $x = 2$

A. 5
B. -5
C. 4
D. -4

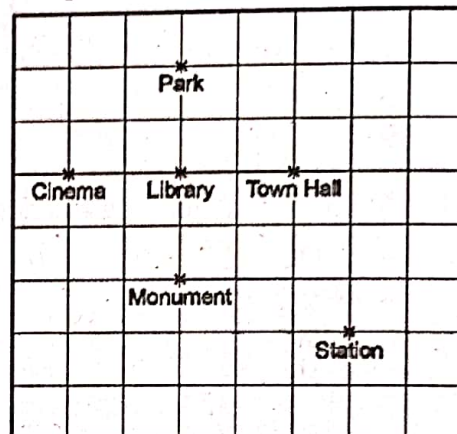
Use the map of a town below to answer questions 25 and 26.

25. Which place is exactly North-West of the Station?

A. Library
B. Town Hall
C. Cinema
D. Park

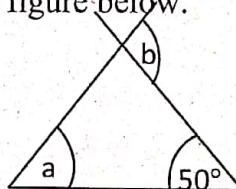
26. Find the bearing of the Monument from the Park.

A. 090°
B. 180°
C. 270°
D. 360°



27. Find the angles marked a and b in the figure below.

A. $a = 50^\circ$ and $b = 150^\circ$
B. $a = 50^\circ$ and $b = 100^\circ$
C. $a = 70^\circ$ and $b = 100^\circ$
D. $a = 40^\circ$ and $b = 130^\circ$

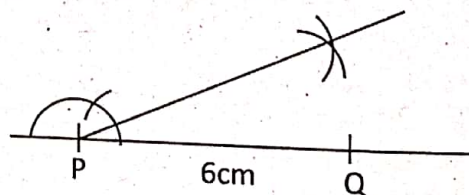


28. The volume of water in a rectangular tank is 30cm^3 . The length of the tank is 5cm and its breadth is 2cm. Calculate the depth of water in the tank.

A. 4.0cm
B. 3.0cm
C. 5.0cm
D. 6.0cm

29. Which of the following best describes the construction below?

A. Constructing the bisector of line PQ
B. Constructing an angle of 45° at P
C. Constructing an angle of 30° at P
D. Constructing a perpendicular at P



30. What is the rule for the mapping below?

x	1	2	3	4
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
y	2	5	10	17

A. $x \rightarrow 3x^2 - 1$
B. $x \rightarrow 5x - 3$
C. $x \rightarrow x^2 + 1$
D. $x \rightarrow 4x - 2$

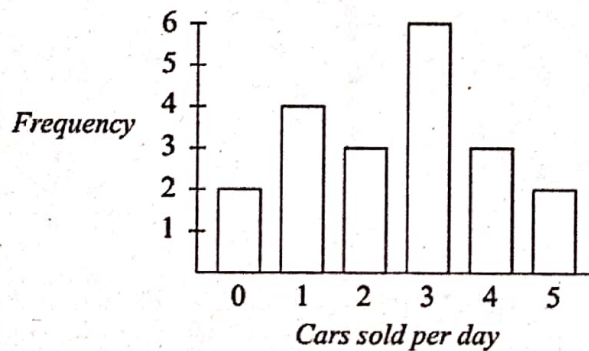
31. A ribbon is 3 meters and 25 centimeters long. If you need 75-centimeter pieces for decorations, how many pieces can you cut from the ribbon?
- A. 3 pieces
B. 6 pieces
C. 5 pieces
D. 4 pieces

32. There are twice as many blue as yellow and four times as many green as blue cubes in a bag. Calculate the probability that a cube taken at random is yellow.

- A. $\frac{1}{2}$
B. $\frac{1}{4}$
C. $\frac{1}{11}$
D. $\frac{1}{8}$

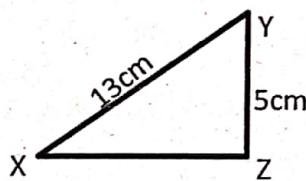
33. The bar chart below shows how many cars were sold by a salesman over a period of time. Find the mean number of cars sold per day.

- A. 2.3
B. 2.5
C. 8.33
D. 3.5



34. In the triangle XYZ , angle $XYZ = 90^\circ$, $|XY| = 13\text{cm}$ and $|YZ| = 5\text{cm}$. What is the length XZ ?

- A. 2.0 cm
B. 25 cm
C. 12 cm
D. 2.5 cm

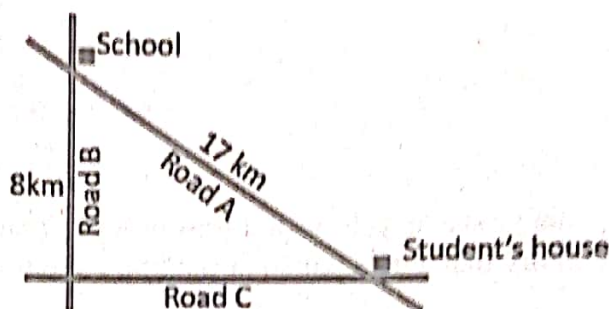


35. Three of the angles of an irregular polygon are 118° , 112° and 98° . If the remaining two angles are equal, what is the size of the equal angles of the polygon?

- A. 106°
B. 110°
C. 202°
D. 210°

Turn over

36. Joe's route from home to school is shown in the figure below. What distance does Joe save if he takes road A instead of the other two? Give your answer to two decimal places.



- A. 6 km
B. 9 km
C. 15 km
D. 3 km
37. Eighty-seven people are divided into three groups. One group has 6 more than the smallest group, and another has 12 more than the smallest group. How many people are in the smallest group?
- A. 21
B. 23
C. 25
D. 27
38. If $a = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$, $b = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$, $c = \begin{pmatrix} -2 \\ -4 \end{pmatrix}$, find $3a + 2b - 5c$
- A. $\begin{pmatrix} 24 \\ 21 \end{pmatrix}$
B. $\begin{pmatrix} 20 \\ 14 \end{pmatrix}$
C. $\begin{pmatrix} 30 \\ 25 \end{pmatrix}$
D. $\begin{pmatrix} 18 \\ 12 \end{pmatrix}$
39. A student scored 58, 60, 55, 72 and y respectively in five subjects in an examination. If the average mark for the five papers was 68, what was her score in the fifth paper?
- A. 82
B. 80
C. 97
D. 95
40. The distance travelled by a cyclist every t hours is given in kilometers as shown in the table below.

t	1	2	3	5	7
Distance	25	50	75	y	175

Find the value of y

- A. 95km
B. 100km
C. 125km
D. 130km

END OF PAPER