BECE 2025 MAHEMATICS

QUESTIONS (100%)

MATHEMATICS BECE 2024 TIPS

ESSAY

TOPICS	AREAS
Construction	 Angles; 60⁰, 30⁰, 90⁰,45⁰,75⁰,105⁰,120⁰ Perpendicular bisector of a line or mediator Perpendicular from a point Locus of points equidistant from two points Locus of points equidistant from two straight lines Triangles Radius measurement
Numbers	 Estimation and approximations -DP, SF, Scientific notation Indices Radicals Fraction and application Decimals Percentages
MEASUREMENT	 Pythagoras theorem: trig ratios, angle of elevation and depression Bearing Area and perimeter of triangle, trapezium, square, rectangle, circles

	4. volume and total
	surface: Cylinder, cone,
	cube, cuboid, prism,
	pyramid
	5. Applications; composite
	shapes
	6. Plane geometry; angle
	7. Enlargement and
	similarities
	8. Polygon
Transformation/linear graph	1. Scale and intervals
	reading
	2. Plotting
	3. Types; reflection,
	rotation, enlargement,
	translation
	4. Finding images
	5. Interpretations of
	graphs
	6. Copying and completing
	tables or relations
	7. Scale and intervals
	8. Plotting
	9. Special lines; x=3, y=5
	10.Gradient
	11.Interpretation of graph
	12.Travel graph
Statistics	1. Pie chart
	2. Bar chart
	3. Mean; table and table
	formation
	4. Finding values
	5. Applications of mean
	6. Median
	7. Mode
	8. Probability
	9. Interpretation of bar
	and pie chart
	11. Other gran he
	11. Otner graphs
Business mathematics	1. Growth
	2. Applications of fraction
	3. Simple interest

	A Ratio and proportion
	5. Discount ,commission
	6. Profit and loss
	7. VAT
	8. NHIL
	9. Electricity tariff
	10.Pension
Algebra	1. Equations and
	inequalities
	2. Algebraic expression;
	simplification,
	factorization, story
	problems
	3. Substitution
	4. Change of subjects
	5. Patterns
Sets	1 Set types and equations
	2. Cet et an angellar
	2. Set story problems

BECE MATHEMATICS 2025 PREDICTED TOPICS

INDIVIDUAL TOPICS FACTS

1. Numbers

- 1. A trader sells oranges from two baskets, A and B. Basket A contained 85 oranges and she sold 48. She sold 59 oranges from basket B and was left with the same number of oranges as in Basket A. How many oranges were originally in Basket B?
- 2. The price of a jacket is three times that of a shirt. The price of a jacket is GHC560.65. Mr Mensa bought two of the jackets and four shirts for his twin sons. Calculate the total amount Mr Mensa paid for the items, correct your answer to:

a) two decimal places

b)three significant figures

3. Simplify: i. $\sqrt{27}$

ii. $\sqrt{72}$ iii $\sqrt{2}^2$

iv.
$$\frac{2\sqrt{2}}{\sqrt{3}}$$

4. Evaluate the following using scientific notation

(a) $\frac{0.0048 \times 0.024}{0.02 \times 0.03}$ (b) $\frac{72000 \times 2400}{9000 \times 200}$

(c) $\frac{2.4 \times 10^{-4} \times 2.6 \times 10^{-3}}{1.2 \times 10^{-2} \times 2 \times 10^{0}}$

5. simplify the fractions

a) $\frac{2}{3} \times \frac{3}{4} - \frac{5}{8} \div 2\frac{1}{2}$ b) $\frac{3}{4} \div \frac{3}{8} + (\frac{4}{5} - \frac{1}{2})$ c) $(\frac{3}{4} + \frac{5}{8}) \times \frac{4}{11} - \frac{1}{2}$

6. simplify the following

(a)
$$\left(\frac{3}{4}\right)^{-2}$$

(b) $\frac{27 \times 9 \times 81^{-2}}{8 \times 2^4}$

7. Solve word problems based on fractions.

a. A test is made up of 20 questions, how many questions must you answer correctly to get a score of 80%?

b. By what percentage was a television set reduced if it was marked GHC2,250 and sold for GHC2,025?

c. In an election involving two contestants, one candidate claimed 52% of the votes, while the other candidate claimed 2,681 votes. If 5000 people voted, how do you know the election results are invalid?

d. Esi and Fusena prepared orange drink by mixing orange squash and water. Esi's drink was made of 3/ 8 orange squash and Fusena's was made up of 2/ 5 orange squash. Whose drink tasted stronger of orange?

RATIO AND PROPORTION

8. A girl deposited GHC 4500 at the bank at a rate of 3% per annum for three years. Find the simple interest. What is the amount at the end of the fifth year?

- The VAT rate of Ghana is 12.5%. A man bought an item at GHC 4500.00, VAT inclusive. Calculate: b) the basic cost of the item. c) the VAT paid by the man.
- ii. If a car costs GHC 80,500.00,what is its new value if there is a discount of 10%?
- iii. A car agent's commission on the sale of a car is 31 2 %. Calculate the commission on a car sold for GHC68,000.00.

9. The value of a mobile phone depreciates at the following rate: Year of manufacture Depreciation on the original value In the first year 5% In the second year 10% In the third year 15% In the fourth year 22% The original value of the mobile phone is GHC 1800.00. Find the value of the mobile phone at the end of each of the first four years

10. The NHIL inclusive price of a television set is GHC1200.00. If the NHIL is charged at a rate of 2.5%, find b) the cost of the television set (NHIL exclusive). the NHIL charged.

11. Kofi Mereku insured his house and paid a premium of GHC 30,000.00. If the insurance company fixed the rate at 5% of the value of the house, calculate the insured value of the house.

12. Find the value of x in the following

a. x: 5 = 15:7

b. 2x: 12 = 5: 4

13. Kofi, ama and yaw received GHS2500.00 to share in the ratio 2:3:x. if yaw had GHS900.00 $\,$

- i. Find the value of x
- ii. Find their share of the money

14. A man gave an amount of money to his three sons yao, esi and ampa in the ratio of their years. If yao is 15 years, esi is 10 years and ampa 5years. If esi had GHS100.00

- i. Calculate the amount given to them
- ii. Find the amount received by the other two.

15. Three boys were given 600 books to share in the ratio 1:2:7.

- i. Find the share of the books
- ii. How does their share differ.

17. Kofi paid GHS800.00 for a television set with VAT inclusive. If the VAT rate is 5%. Calculate

- i. The price of the TV set
- ii. The VAT paid on the TV set

18. Kofi received GH $\not\subset$ 2000 as salary. He was given 5% tax free. If the government charges a tax of 10%.

- i. Calculate his taxable income
- ii. Calculate tax paid
- iii. Calculate his net pay

19. Musa bought a car for \$20000. In two years time he sold the car for \$1800. Calculate

- i. The depreciation of the car
- ii. The depreciated rate

20. Esi bought a phone for \$100.00 the phone depreciated 2% annually for two years.

i. calculate the depreciation

ii.the new worth of the phone

21. A sales boy in a supermarket sold 10 cartons of soap and 5 bags of rice. If the items were bought at $GH \notin 2.00$ per a soap and $GH \notin 1.00$ per a cup of rice and sold them at $GH \notin 2.50$ for a soap and $GH \notin 1.20$ for a cup of rice. Given that there are 100 soaps in each carton and 50 cups of rice in each bag of rice.

- a. Calculate the total cost obtained from the supermarket
- b. Find the total sales of both the rice and the soap
 - c. Calculate the profit or loss

ALGEBRAIC EXPRESSION

SAMPLE CONSTRUCTION QUESTION 2024

- 1. Using ruler and a pair of compasses only,
 - a. Construct triangle ABC such that, |AB|=8cm, $< ABC = 90^{0}$ and $< BAC = 30^{0}$
 - b. Construct the mediator of < BAC
 - c. Construct the mediator of |AB|
 - d. Construct the mediator of |BC|
 - e. Using O, the point of intersection of the mediators of |AB|, |BC| and < BAC and radius
- 2. Using ruler and a pair of compasses only,

Construct triangle ABC such that, |AB| = 10cm, $< ABC = 60^{\circ}$ and $< BAC = 45^{\circ}$

- i. Construct the mediator of |AB| from C
- ii. Construct the mediator of |BC|
- iii. Locate P, the point of intersection of two mediators
- iv. With P as the centre and radius AP, construct a circle to pass through the three vertices
- v. Measure the radius AP
- 3. Using ruler and a pair of compasses only,

Construct triangle ABC such that, |AB|=9.8cm, $< ABC = 60^{\circ}$ and $< BAC = 75^{\circ}$

- a. Construct the mediator of AC
- b. Construct the mediator of |AB|
- c. Construct the mediator of |BC|
- d. Measure
 - i. BC
 - ii. AC
- 4. Using ruler and a pair of compasses only,

Construct triangle ABC such that, |AB|=10cm, $< ABC = 60^{\circ}$ and $< BAC = 30^{\circ}$

a. Construct the mediator of < BAC to meet BC at S

- b. Construct the perpendicular bisector of |BC|
- c. Extend AS to P such that |AS| = |SP|. Join |CP| and |BP|
- 5. using a ruler and a pair of compasses only, construct triangle XYZ, such that

 $|XY|{=}5\text{cm},~|XZ{=}4\text{cm}$ and $|YZ|{=}6\text{cm}.|$

b. i. Construct the mediator of line YZ

- ii. Construct the mediator of line XY
- iii. Locate O the point of intersection of the mediators of lines YZ and XZ
- iv. With centre O and radius OY, draw a circle
- a. Measure the radius of the radius you have in (b) (iv) above and hence calculate the circumference of the circle. $[Take \pi = \frac{22}{7}]$
- 6. Using a ruler and a pair of compasses only,
 - i. Construct triangle ABC with sides AB=7cm BC=8cm and AC=9cm
 - ii. Draw the perpendicular bisector of three sides
 - iii. Locate the point of the intersection, O of the perpendicular bisector

With centre O and radius OA, draw a circle to pass through the vertices of the triangle

- 7. a. Using a ruler and a pair of compasses only, construct triangle XYZ, such that
 - |XY| = 6cm |XZ| = 8cm and |YZ| = 10cm.
 - b. i. Construct the mediator of line YZ
 - ii. Construct the mediator of line XZ
 - i. Locate O the point of intersection of the mediators of lines YZ and XZ

With centre O and radius OY, draw a circle

- 8. using ruler and a pair of compasses only, construct
 - (a) (i) triangle ABC such that the length AB = 10cm, length BC= 8cm and angle ABC = 60°
 - (ii) a perpendicular from C to meet AB at K
 - (iii) Measure:
 - (α) angle BAC
 - (β) length CK
 - (b) Calculate, correct to the nearest whole number, the area of triangle ABC
- 9. Using ruler and a pair of compasses only,
- (a) Construct
 - i. Line |*AB*|=10cm
 - ii. Perpendicular bisector at A to C

iii. Angle $ABC = 30^{\circ}$

(b) Construct

- i. Perpendicular bisector at B to D such that |AC| = |BD|
- ii. Join **A** to **D**

(c) Measure

- i. |*AD*|
- ii. < |*ADB*|

(d) (i) extend **D** to **C**

(ii) Name the intersection of |AD| and |BC|, O. How many triangles were formed?

- (iii) With Centre **O** and radius **2cm**, construct a circle. Shade the circle.
- 10) It takes an average speed of $50kmh^{-1}$ for Kofi to move from town A to town B by using a time of 2hours. From town B, he used an average speed of $40kmh^{-1}$ and time of 2hours to reached town C. From town C to the starting town A, he also used an average speed of $20kmh^{-1}$ with a time of 4hours.
 - a. By the use of geometric construction, construct the journey of Kofi of town A,B and C given a scale of 10km: 1cm.
 - b. Kofi stopped at a rest stop T to buy food such that distance AT = TB. By using construction, show the place he stopped to buy the food, T
 - c. Construct a line showing the resting place of Kofi such that, it is equidistant from town A and C
 - d. Name the intersection of the lines showing the place he stopped for food and the resting place O. With O as the Centre and radius OA, construct a circle. Measure the radius of the circle
- 11) A boy sailed from port A to B with a speed of $65kmh^{-1}$ and a bearing of 060° using 2hours. From port B, he sails to port C, South of port B using a speed of $60kmh^{-1}$ and the same time as from port A to port B. He then sails back to port A (west of port C) with a speed of $50kmh^{-1}$ and a time of 1 hour
 - a. By using a scale of 1cm to 10km and geometric construction, construct the movements of the boy
 - b. Find the total time and distance covered
 - c. Calculate the area of the figure formed
- 13. Construct a square of side 6cm

14. Construct a hexagon of side 7cm

15. Construct a triangle ABC such that AB = 7 cm, AC = 9 cm, and $\angle BAC = 45^{\circ}$. Measure and state the length of BC.

16. Draw a line segment PQ = 10 cm. Construct the perpendicular bisector of PQ and label the midpoint M. Measure the lengths of PM and MQ to verify that M is the midpoint.

17. Construct an angle \angle XYZ = 120°. Bisect the angle and label the bisector line ZM. Measure and state the angle between ZY and ZM.

18. Construct a parallelogram ABCD where AB = 6 cm, AD = 8 cm, and \angle BAD = 60°. Measure and state the lengths of the diagonals AC and BD.

19. Draw a circle with center O and radius 5 cm. Construct a tangent to the circle from a point P that is 8 cm away from the center O. Label the point of tangency T and measure the length of PT.

20. Given a fixed point A, draw a locus of points that are 4 cm away from A. Label this locus as circle C with center A. Then, draw a locus of points that are 6 cm away from a fixed point B such that AB = 10 cm. Identify and label the points of intersection of the two loci.

21. Construct a rhombus PQRS where the diagonals PR = 10 cm and QS = 8 cm. Measure and state the lengths of the sides of the rhombus.

22. Draw a circle with center O and radius 6 cm. Construct a triangle ABC inscribed in the circle such that AB = 7 cm and AC = 8 cm. Measure and state the length of BC.

23. Draw a line segment AB = 12 cm. Construct a point C that is 4 cm away from AB. Construct a perpendicular from point C to line AB and label the intersection point D. Measure and state the length of CD.

24. Construct a triangle PQR with sides PQ = 6 cm, QR = 7 cm, and PR = 8 cm. Construct the circumcircle of triangle PQR and measure the radius of the circumcircle.

Note: solve similar examples

It is a topic which comes every year. It will come in 2024 BECE.

FACTS: calculation: mean, mode, median, applications (averages) Diagrams: bar chart, pie chart, interpretation of bar and pie chart

PREDICTIONS AND FORECAST FOR 2024

- 1. Calculations: mean, mode median (90% likelihood)
- 2. Pie chart, bar chart (100% likelihood)
- 3. Between bar and pie chart: the chance is 50:50.
- 4. Action: learn/teach calculations, bar chart and pie chart.

Sample likelihood 2024 questions statistics

1. The table below represents marks obtained by students in a test.

Marks	Frequency
1	10
2	3
3	5
4	4
5	2
6	1
7	6

- a. Calculate the mean score
- b. Find the
- f. Modal mark
- ii. Median
- c. Draw a bar chart to represent the information
- 2. The data below represent marks obtained by students in a test.

1	3	5	4	2	5
3	4	5	3	6	5
1	3	3	4	3	3
7	6	7	3	1	2
1	2	4	2	3	6
4	4	7	3	2	7
3	2	1	2	5	6
5	1	2	3	4	1

- a. Construct a frequency distribution table for the data above.
- b. Calculate the mean
- c. Find the median and modal mark
- d. If a child is selected at random, what is the chance of meeting a student who scores not less than 4 marks?
- 3. The government of Ghana allocated some amount of money to certain sectors of the economy. The government gave the agriculture sector 30% of the funds, the educational sector had 20% of the fund, 15% of the funds were given to the information sector, presidency 25% and rest were given to the rural development sector. If the government allocated *GH*C5,200,000 to all the sectors.
 - a. How much was given to the rural development sector
 - b. Illustrate the sectors using a pie chart
 - c. Calculate the average expenditure

4.

Marks	1	2	3	4	5	6	7	8	9
No. of	3	2	5	7	8	4	0	1	6
candidates									

a) From the table, find

- i. the modal mark
- ii. how many candidates took the test

iii. The mean mark of the test

b.

if 20% of the candidates failed.

i. how many failed?

ii. what is the least mark a candidate should score in order to pass?

5. The table below represent marks of 50 students in a test

marks	2	3	4	5	6	7	8	9	10
Number of students	3	4	5	m+5	8	4	7	6	0

- a. Find the value of m
- b. Calculate the mean

- c. Find the mode and median
- 6. In a house, the ages of a group are 8, 11, 10, 6, 7, 3x, 11,11

If the mean age is 9years. Find

- a. The value of x
- b. The modal age
- c. The median age
- 7. A group of 300 mathematics teachers were classified as follows:

University graduates	120
Diplomats	90
Specialist	50
Others	У

- a) Calculate the value of y
- b) Draw a pie chart to illustrate the above information
- 8. The table below gives the frequency distribution of marks obtained by some

students in scholarship examination.

Marks(x)	15	25	35	45	55	65	75
Frequency	1	4	12	24	18	8	3
(f)							

- a. Calculate correct to 3 significant figure, the mean mark
- b. Find the:
 - i. Model mark
 - ii. Range of the distribution
 - iii. Draw a bar chart
- 9. The table below shows the distribution of ages of children who were treated in a

clinic in a day

Age (years)	1	2	3	4	5
Frequency	6	4	2	3	5

Find:

i. The mean age

- ii. The modal age
- c. Draw a pie chart for the distribution

10. The probability of meeting a female in a house is $\frac{1}{3}$. If the number of females in

the house is 40, find

- i. the total number of students in the house
- ii. the number of males in the house
- iii. the probability of females
- 11. A box contain 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
- III. the probability of green ball
- IV. the probability of red or green ball
- V. the probability of red and green balls
- 12. Copy and complete the table below

Н	H,1	H,2		H,4	H,5	H,6
Т		Т,2	Т,3		T,5	

Using the table find probability of meeting

- i. A head and an even number
- ii. A tail and an odd number
- 13. The table below represents marks obtained by students in a test. Use it to answer

the questions on it.

Marks	Frequency
1	F
2	2f
3	f +1
4	3f

5	f-2
6	f-1

- (a) Find expression for
 - i. $\sum f$.
 - ii. $\sum fx$.
- iii. mean
- (b) If the mean is $\frac{19}{7}$, find the value of fx

14. Use the bar chart below to answer the questions.



1 2 3 4 Grades

- a) Calculate the mean grade
- b) Find the modal grade
- c) What is the median grade?
- d) What is the probability of meeting who scored at least grade 3
- e) If the pass grade is 3, what is the chance of meeting a student who pass the test?
- 15. A fair die is toss once
 - a) List the set of possible outcome
 - b) Find the probability of obtaining an old number
 - c) Find the chance of meeting even number
- 16. The average age of a family of eight is 30 years. The average age of the six

children in the family is 19 years. If the mother is four years younger than the father, calculate the age of the father.

17. In a junior high school, the average students is 50, if the ratio of the classes are;

2:3:5.

- a) Calculate the total students in the school
- b) Find the students in each class
- c) Find the modal class
- d) If the school charge average school fees of GH¢500.00. calculate the total revenue of the school
- 18. The pie chart shows the distribution of textbooks to six classes A, B, C, D, E and F in a school.



(i) If Class D was given 720 textbooks, how many textbooks were distributed to each of the remaining classes?

(ii) What is the average number of textbooks distributed to the classes?

(iii) How many classes had less than the average number of textbooks distributed?

19. 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.

20

A class of 30 students was asked about their favorite sport. The results are as follows: Football - 12, Basketball - 8, Volleyball - 6, Tennis - 4.

- a) Represent the data in a frequency table.

- b) What is the mode of the data?

2.1

The scores of 10 students in a mathematics test are as follows: 45, 56, 67, 78, 89, 56, 45, 78, 56, 67.

- a) Calculate the mean score.

- b) Determine the median score.

- c) Identify the mode.

22.

The heights (in cm) of students in a class are as follows: 150, 155, 160, 165, 170, 175, 180, 185, 190, 195.

- a) Calculate the range of the heights.

- b) Find the first quartile (Q1) and the third quartile (Q3).

23.

In a survey of 100 students, the following information was collected about their favorite subjects: Mathematics - 25, Science - 20, English - 30, Social Studies - 15, ICT - 10.

- a) Draw a pie chart to represent the data.

- b) What angle in the pie chart represents the students who chose Mathematics as their favorite subject?

24.

The ages of people attending a community event are recorded as follows:

| Age Group (years) | Frequency |

|-----|-----|

0-10	5	Ι
11-20	10	I
21-30	15	I
31-40	20	I
41-50	10	Ι

- a) Draw a histogram to represent the data.
- b) Which age group has the highest frequency?

25.

- A bag contains 5 red, 3 green, and 2 blue balls. If one ball is picked at random:
- a) What is the probability of picking a red ball?
- b) What is the probability of picking a green ball?
- c) What is the probability of not picking a blue ball?

26.

The marks obtained by 15 students in a quiz are as follows: 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48.

- a) Construct a box plot for the data.
- b) Identify any outliers.
- 1. In a small village, one bus arrives a day.

The probability of rain in the village is 0.3.

If it rains, the probability of a bus being late is 0.4. If it does not rain, the probability of a bus being late is 0.15.

(a) Complete the tree diagram



(b) Work out the number of days the bus will be late over a period of 80 days

TRANSFORMATION/ LINEAR GRAPH

PREDICTIONS FOR 2025

Transformation and graph of relation: these are topics that are set in almost every BECE. If there should be graph work it will be transformation or linear but I favour transformation

Likelihood: The likelihood of the topic is closer to 50% in that it can be absent from the question list too.

ACTIONS: Learn transformation and linear graph for 2025 BECE but don't rest all your hope on them. If I am asked with a question on whether transformation will appear in BECE 2025, I will give the chance of it occurring bias towards it not appearing and give the chance of appearance less hope. Therefore, transformation is very likely to appear in the BECE.

Learn linear graph too.

Reason: most students get frustrated when they don't meet what they have planned to do in examinations. So learn it but don't be double sure.

WHAT TO LEARN

CONTENT: scaling, plotting, types of transformation, reverse of transformation.

- 1. Reflection: x-axis and y-axis
- 2. Rotation: clock wise and anti-clockwise(90, 180,270 degrees)
- 3. Enlargement
- 4. Translation

SAMPLE BECE 2025 LIKELIHOOD QUESTION

- 1. Using a scale of 2cm to 2 units on both axis
 - a. Mark the x-axis -10 to 10 ($-10 \le x \le 10$) and y-axis $-12 \text{ to } 12 (-12 \le y \le 12$.
 - b. Plot on the same graph sheet ABC such that, $\overrightarrow{AB} = \binom{8}{4}$, B(10,1) and $\overrightarrow{BC} = \binom{-5}{7}$. Join *ABC*.
 - c. Draw on the same graph paper images of A, B and C using a half turn rotation about the origin, where $A \rightarrow A_1$, $B \rightarrow B_1$, and C_1 .
 - d. Draw on the same graph sheet the images of A, B and C under reflection in the line x=0 $A \rightarrow A_2$, $B \rightarrow B_2$ and C_2
 - e. What single transformation maps $A_2B_2C_2$ onto $A_1B_1C_1$
- 2. Using a scale of 2cm to 2 units on both axis
 - a. Mark the x-axis -10 to 10 ($-10 \le x \le 10$) and y-axis -10 to 10 ($-10 \le y \le 10$).
 - b. Plot on the same graph sheet A(0,10), B(10,0) and C(0,0). Join the coordinates of ABC. What figure is that?
 - c. Draw on the same graph paper images of A, B and C 90⁰ rotation anti clockwise about the origin, where $A \rightarrow A_1, B \rightarrow B_1$ and $C \rightarrow C_1$.
 - d. Draw on the same graph paper images of A, B and C half turn rotation about the origin, where $A \rightarrow A_1$, $B \rightarrow B_1$, and $C \rightarrow C_1$.
 - e. Draw on the same graph sheet the images of A, B and C under reflection in the line y=0 $A \rightarrow A_2$, $B \rightarrow B_2$ and C_2
 - f. Draw the images of ABC under enlargement with scale factor $-\frac{1}{2}$

Where $A \rightarrow A_3$, $B \rightarrow B_2$ and $C \rightarrow C_2$.

- 3. Using a scale of 2cm to 2 units on both axis
 - a. Mark the x-axis -10 to 10 ($-10 \le x \le 10$) and y-axis -10 to 10 ($-10 \le y \le 10$).
 - b. Plot on the same graph sheet A(1,5), B(7,7) and C(5,10). Join the coordinates of ABC. What figure is that?
 - c. Draw on the same graph paper images of A, B and C 270 anti-clockwise rotation about the origin, where $A \rightarrow A_1$, $B \rightarrow B_1$, and $C \rightarrow C_1$.
 - d. Draw on the same graph sheet the images of A, B and C under translation by vector $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$ where $A \to A_2$, $B \to B_2$ and C_2
 - e. Draw the images of ABC under enlargement with scale factor $-\frac{1}{2}$

Where $A \rightarrow A_3$, $B \rightarrow B_2$ and $C \rightarrow C_2$.

4. Given that A(−2, −3), B(−3, −4) and C(−5, −10),
M(−2,3), T(−3,4) and P(−5,10). State the types of transformation that maps Q(2,3), W(3,4) and D(5,10) uder

- b. MTO
- 5. a. Using a scale of 2cm to 1 unit on each axis draw on a graph sheet two perpendicular axes OX and OY
 - a. on this graph, mark the x-axis from -5 to 5 and the y-axis from -5 to 5.
 - b. Plot the point A(-1,3), B(3,2) and C(2,1). Join the points to form a triangle.
 - c. Draw the image of the triangle ABC under an anticlockwise rotation through 90° about the origin such that $A \rightarrow A_1$ and $B \rightarrow B_1$ and $C \rightarrow C_1$.
 - d. Draw the image of the triangle ABC under the transaction by the vector $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ such that $A \rightarrow A_2$, $B \rightarrow B_2$ and $C \rightarrow C_2$. Name two points that coincide.

6 a. Using a scale of 2cm to 1 unit on both axes draw two perpendicular lines OX and OY

on a graph sheet.

- b. On this graph sheet mark the x-axes from -5 to 5 and y-axis from -6 to 6
- d. Plot on the same graph sheet the points A(1,1) B(4,3) and C(2,5) join the points A,B and C to form triangle
- e. Using the y-axis as mirror line, draw the image of the triangle ABC such that $A \rightarrow A^1, B \rightarrow B^1$ and $C \rightarrow C^1$. Write down the coordinate of A^1, B^1 and C^1
- f. Using the x-axis as the mirror line, draw the image of triangle ABC such that $A \rightarrow A^1 \ B \rightarrow B^1$ and $C \rightarrow C^1$. Write down the coordinate of A", B" and C"

7a. Using a scale of 2cm to 1 unit on both axes, draw two perpendicular axes OX and OY on a graph sheet. On the same graph sheet, mark the x-axis from 5 to 5 and y-axis from 6 to 6.

a. ABC

- a. On the same graph sheet plot the points A(2,5) B(4,3) and C(1,1). Join the points A,B and C to form a triangle.
- b. Reflect triangle ABC in the y-axis such that A →A, B →B, and C C.
 label the vertices of triangle A, B, C.
- c. Translate triangle A, B, C by the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ such that A $\rightarrow A_2$, B B₂ and C C₂
- d. Join the vertices A, B, B_2 and C. name the figure formed.

9(a) Using a scale of 2 cm to 1 unit on both axes, draw on a graph sheet, two perpendicular axes OX and OY for $-5-5 \le x \le 5$ and $-5 \le y \le 5$.

(i) Plot, indicating the coordinates of all points P(1, 1), Q(1, 2), R(2, 2) and S(2, 1) on a graph sheet. Join the points to form square PQRS.

(ii) Draw and indicate clearly all coordinates, the image P1Q1R1S1 of square PQRS under an enlargement from the origin with a scale factor of 2, where $P \rightarrow P1$, $Q \rightarrow Q1$, $R \rightarrow R1$ and $S \rightarrow S1$.

(iii) Draw and indicate clearly all coordinates, the image P2Q2R2S2 of square

P1Q1R1S1 under a reflection in the x-axis where P1 \rightarrow P2, Q1 \rightarrow Q2, R1 \rightarrow R2 and S1 \rightarrow S2 (b) Using the graph in 4(a), find the gradient of line R2S.

LINEAR GRAPH (GRAPH OF RELATIONS)

1. (a) Copy and complete the table for two linear equation y = 2 - 2x and $y = \frac{1}{2}(x + 1)$

y = 2 - 2x					$y = \frac{1}{2}(x+1)$							
х	-1	0	1	2	3		х	-1	0	1	2	3
у		2			-4		у	0				2

(b) Using a scale of 2cm to 1 unit on both axes, draw on the same graph sheet the graphs of

$$y = 2 - 2x$$
 and $y = \frac{1}{2}(x+1)$

- (c) Using the graph, find the values of x and y at the point where the two lines meet
- 1. (a) The table below represents the relation y = 3x b, find the value of b

х	-4	-3	-2	-1	0	2	3	4
у	-14				2			10

(b) Copy and complete the table for the relation y = 3x - b

(c) Using a scale of 2cm to 1 unit on the x axis and 2cm to 2 units, draw a graph of y = 3x - b

(d)Using the graph find

- i. The gradient
- ii. The value of x when y=0
- iii. The value of y when x=0
- iv. The value of x when y= 2.5
- 2. (a) given that y = ax 1, copy and complete the table below

х	-3	-2	-1	0	1	2	3	4
у	-5			-1				7

(b)using a scale of 2cm to 1 unit on both axes draw

- i. a graph of y = ax 1
- ii. y 4 = 0.
- iii. x 3 = 0.

(c) label the point of intersection of y = ax - 1, y - 4 = 0 and x - 3 = 0, A, B and C. Shade ABC and find the perimeter.

4(a) (i) Copy and complete the following mapping:

X	1	2	3	4	5	6	7
\downarrow							
у	5	7	9	-	-	-	17

- (ii) Determine the rule for the mapping
- (b) Draw two perpendicular axes Ox and Oy on a graph sheet.
- (c) Using a scale of 2cm to 1 unit on the x-axis and 2cm to 2 units on the y-axis, mark the x-axis from 0 to 8 and the y-axis from 0 to 20.
- (d) Plot the point for each ordered pair (x, y) and join them with a straight line.
- (e) Find:
 - (i) y, when x is 0;
 - (ii) x, when y is 14

MENSURATION AND GEOMETRY

1. Find the value of the angles lettered



15. The diagram shows a trapezium with semi-circle portion QRS



Find

i. Perimeter of the figure **PTSRQ**

ii. Total area of the figure **PTSRQ** $\left[Take \pi = \frac{22}{7}\right]$

16(a) Given that vectors
$$\mathbf{p} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$
 and $\mathbf{q} = \begin{pmatrix} x \\ y \end{pmatrix}$, find :
(i) \mathbf{q} if $\mathbf{q} - \mathbf{p} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$;
(ii) the magnitude of the vector $\mathbf{q} - \mathbf{p}$



In the diagram |AB| = |AC|, angle ADC = 30° and angle ACD = 7x - 25°. Find

- (i) the value of x;
- (ii) angle DAC;

angle BAD





Question 1

A ship sails from a port on a a bearing of 065° for 100 km, then changes course and sails on a bearing of 155° for another 150 km.

- (a) What does the bearing 065° mean in terms of direction.
- (b) Calculate the angle through which the ship turned when it changed direction.
- (c) Sketch a diagram to illustrate the ship's movement.

Question 2

A plane flies from town A to town B on a bearing of 045° and then from town B to town C on a bearing of 135°.

- (a) What compasss directions do bearings 045° represent?
- (b) Calculate the angle between the two bearings.
- (c) Suggest why understanding bearings is important in aviation.

Question 3

From a school, a hospital is located 6 km due east, and a police station is located 8 km due north.

- (a) Use a diagram showing the relative positions of the school, hospital, and police station.
- (b) Using the diagram, calculate the bearing of the hospital from the police station.

Question 4

A resscue helicopter flies from point A to point B on a bearing 300° and then from point B to point C on a bearing 045°.

- (a) In which compass direction did helicopter fly from A to B?
- (b) What was the change in direction when the helicopter turned from B to C?
- (c) Explain how bearings help in rescue missions.