DAS INNOVATIONS

BECE 2019 PREDICTIONS

The Mystery Behind BECE

Mathematics

DANSO KWASI NTI SAMUEL (DAS)

BA (ECONOMICS UNIVERSITY OF GHANA)

www.dasexams.com

info@dasexams.com

For more copies whatsapp: 0500451328 or 0246374867

Get end of term exams and mocks

BECE 2019 MAHEMATICS

QUESTIONS (100%)

1. Algebraic expressions (Factorization, expansion, substitutions, equations, applications
2. Vectors and bearings
3. Fractions: applications
4. Mensuration : area and perimeter, volume and total surface, angles, bearing
5. Statistics: pie and bar chart, mean , mode, median, probability
6. Business mathematics : profit and loss, interest, ratio and proportion , tax and depreciation
7. Rate: capacity, time, money and transactions rate
8. Construction
9. Linear graph / vectors and transformation

MATHEMATICS BECE 2019 TIPS

ESSAY

TOPICS	AREAS
Construction	1. Angles; 60^0, 30^0, 90^0,45^0,75^0,105^0,120^0 2. Perpendicular bisector of a line or mediator 3. Perpendicular from a point 4. Locus of points equidistant from two points 5. Locus of points equidistant from two straight lines 6. Triangles 7. Radius measurement
Mensuration	1. Area and perimeter of triangle, trapezium, square, rectangle, circles 2. Cylinder; volume and total surface 3. Cube and cuboid 4. Applications; composite shapes 5. Plane geometry; angle 6. Enlargement and similarities 7. plygon
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
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
Business mathematics	1. Growth 2. Applications of fraction 3. Simple interest 4. Ratio and proportion 5. Discount ,commission 6. Rates and taxes 7. Profit and loss
Miscellaneous	1. Fraction applications 2. Equations and inequalities 3. Algebraic expression; simplification, factorization, story problems 4. Indices 5. Substitution 6. Number bases
sets	1. Set types and equations 2. Set story problems

BECE YEARLY ANALYSIS ON THE FOUR

YEAR	CON	TRANS/LINEAR	STATS	B.MATHS	MENSU	SETS
90	√		√			√
91	√		√			√
92	√	√	√	√		
93	√	√	√	√		
94	√	√	√		√	
95	√	√	√	√	√	√
96	√	√	√	√		
97	√	√	√		√	
98	√	√	√	√	√	
99	√	√	√	√		√
00	√		√	√	√	
1	√	√	√	√	√	√
2	√b	√b	√,√b	√,√b	√	√b
3	√		√	√	√	√
4	√	√	√	√	√	
5	√	√	√	√		
6	√	√	√	√	√	√
7	√	√	√	√	√	√
8	√	√	√	√	√	√
9	√	√√	√	√	√	
10		√	√		√	√
11	√	√	√	√	√	√
12	√	√	√	√	√	
13	√	√	√	√		√
14	√	√	√	√	√	√
15	√p	√p	√			
16	√	√	√	√		√
17	√	√	√	√	√	√
18	√	√	√	√	√	√

BECE MATHEMATICS 2019 PREDICTED TOPICS

INDIVIDUAL TOPICS FACTS

CONSTRUCTION: it is a question that comes every year. It will be in 2019 BECE

FACT 1: angles (only 60, 30, 90, 45) extreme 75, 120 degrees

FACTS 2: Bisection of line (mediators), from a point (mediator), bisection of angles,

Facts 3: triangle, quadrilaterals

SAMPLE CONSTRUCTION QUESTION 2018

1. Using ruler and a pair of compasses only,
   a. Construct triangle ABC such that, $|AB|$=10cm, $< ABC = 45^0$ and $< BAC = 120^0$
   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, $< ABC = 60^0$ and $< BAC = 30$

   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, $|AB|$=10cm, $< ABC = 60^0$ and $< BAC = 75^0$

   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, $< ABC = 60^0$ and $< BAC = 30^0$

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|=5cm, |XZ=4cm and |YZ|=6cm.|

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 $|\boldsymbol{AB}|$=10cm
ii. Perpendicular bisector at **A** to **C**
iii. Angle $A\boldsymbol{BC} = 30°$

(b) Construct

i. Perpendicular bisector at B to D such that $|\boldsymbol{AC}|$= $|\boldsymbol{BD}|$
ii. Join **A** to **D**

(c) Measure

i. $|\boldsymbol{AD}|$
ii. $< |\boldsymbol{ADB}|$

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

(ii) Name the intersection of $|\boldsymbol{AD}|$ and$|\boldsymbol{BC}|$, 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

Note: solve similar examples

STATISTICS

It is a topic which comes every year. It will come in 2019 BECE.

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

PREDICTIONS AND FORECAST FOR 2019

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 2019 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 GHC5,200,000 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 candidates	**3**	**2**	**5**	**7**	**8**	**4**	**0**	**1**	**6**

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	y

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 (f)	1	4	12	24	18	8	3

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

H	H,1	H,2	----	H,4	H,5	H,6
T	---	T,2	T,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

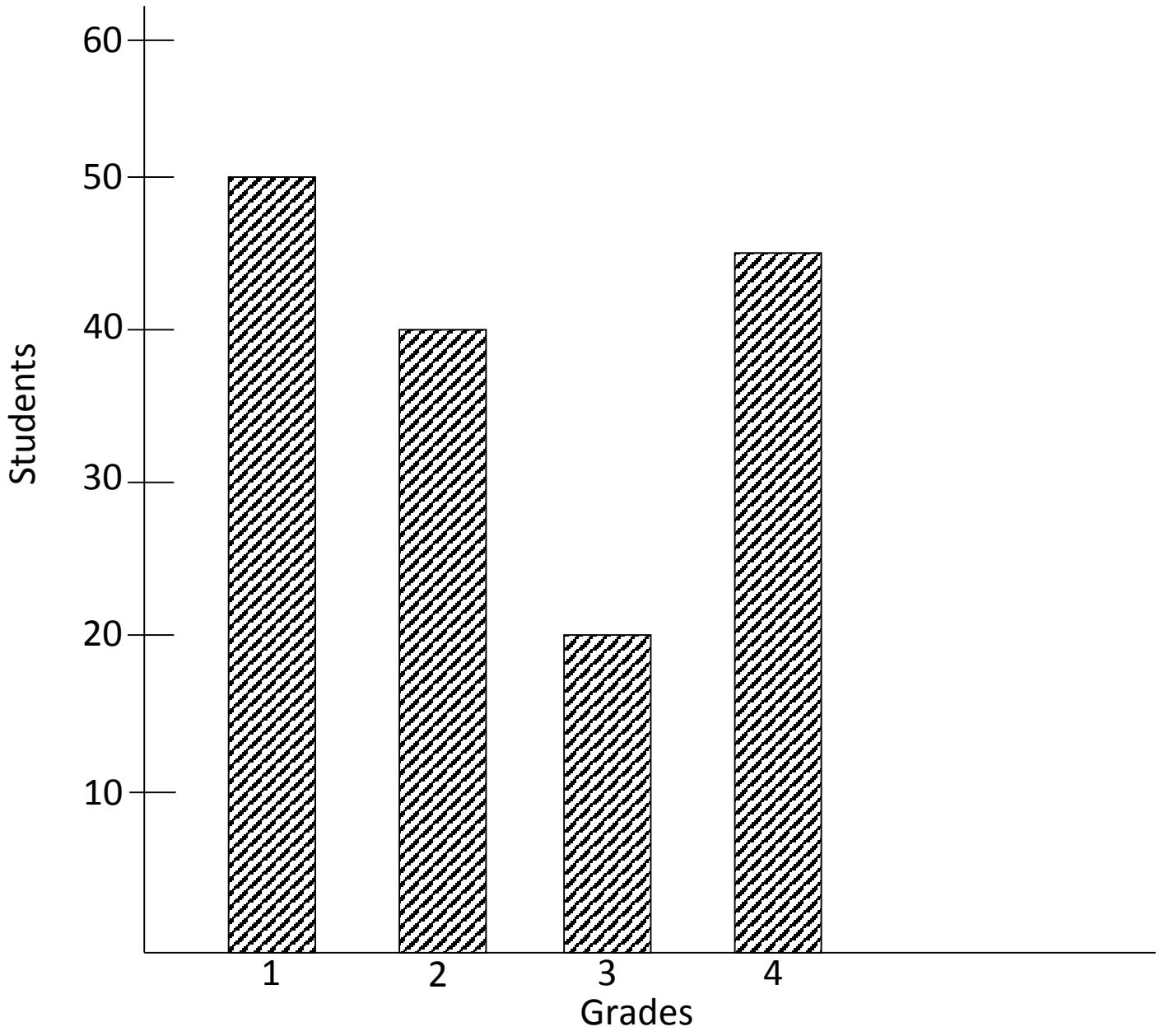
i. $\sum f$.

ii. $\sum fx$.

iii. $mean$

(b) If the mean is $\frac{19}{7}$, find the value of f

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



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. In a school

TRANSFORMATION/ LINEAR GRAPH

PREDICTIONS FOR 2019

Transformation: it is a topic that is set almost every BECE. If there should be graph work it will be transformation or linear but I favour linear graph

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 2019 BECE but don't rest all your hope on it. If am asked with a question on whether transformation will appear in BECE 2019, I will give the chance of it occurring bias towards it not appearing and give the chance of appearance less hope.

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.

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

What to learn:

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

SAMPLE BECE 2018 LIKELIHOOD QUESTION

1. Using a scale of 2cm to 2 units on both axis
   a. Mark the x-axis -10 to 10 ($-10 \leq x \leq 10$) and y-axis$-12\ to\ 12$ ($-12 \leq y \leq 12$.
   b. Plot on the same graph sheet $A(2,5), B(10,1)\ \ and\ C(5,8)$. Join the coordinates$ABC$.
   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 ($-10 \leq x \leq 10$) and y-axis -10 to 10 ($-10 \leq y \leq 10$).
   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 $A, B\ and\ C\ 90^0$ 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 ($-10 \leq x \leq 10$) and y-axis -10 to 10 ($-10 \leq y \leq 10$).
   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 $\binom{-2}{-1}\ \ where\ A \rightarrow A_2, B \rightarrow B_2\ \ and\ C_2$
   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
   a. ABC
   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. 0n 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. 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 $\rightarrow$A, B $\rightarrow$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 $\rightarrow$ B_2 and C $\rightarrow$ C_2

d. Join the vertices A, B, B_2 and C. name the figure formed.

(8) The image of the vertices of triangle a triangle ABC are $A_1(-3,-4), B_1(-6,7)$ *and* $C(-1,-5)$ after a translation by a vector $\binom{1}{2}$

a) Find the coordinates of triangle ABC
b) Find the images of triangle ABC under
   i. Reflection in the y-axis
   ii. Reflection in the x-axis
   iii. $\binom{x}{y} \rightarrow \binom{2x+y+2}{x+2y+1}$
   iv. Rotation through 90 degrees about the origin

LINEAR GRAPH (GRAPH OF RELATIONS)

This topic always alternate with transformation

CONTENT

1. Copying and completing a table for a given relation
2. Plotting ordered pairs
3. Finding the values of x and y when other values are given
4. X-intercept and y-intercepts
5. Gradient
1. The government of Ghana formulated the daily minimum wage of the workers in the country as $\boldsymbol{W = 2P + 5GHC}$, where W is daily wage rate, P is price level and GHC is Ghana cedi.
6. **a).** Copy and complete the table below for the relation $\boldsymbol{W = 2P + 5GHC}$

P(GHC)	0	1	2	3	4	5	6	7	8	9	10
W(GHC)	5								21		

b) Using a scale of 2cm to 1 units on the x-axis and 2 cm to 3 units on the y-axis,

i) Mark the x-axis as price level from 1 to 9 and the y-axis as the wage rate from 2 to 27

ii) Plot the ordered pairs

c) Using the graph, predict

i) The amount a person will receive if the price level is 7.5GHC

ii) The price level if a person receives 20 GHC as a daily wage

iii) find the gradient

1. The government of Ghana formulated the daily minimum wage of the workers in the country as $\boldsymbol{W} = \text{GH¢}\,\boldsymbol{P}$, where W is daily wage rate, P is price level and GH¢ is Ghana cedi.

(a) Using a scale of 2cm to 1 unit on the x-axis and 2 cm to 3 units on the y-axis, Mark the x-axis as price level from GH¢0.00 to GH¢10.00 and the y-axis as the wage rate from GH¢3.00 to GH¢30.0

(b) Draw a graph of

(i) $\boldsymbol{W} = \text{GH¢}\,\boldsymbol{P}$

(ii) $P = \text{GH¢}\,\mathbf{8}$

(iii) $P = \mathbf{0}\text{GH¢}\,\boldsymbol{P}$

(c) (i) Let the graphs intersect and label the intersection as; A, B and C

(ii) Shade the figure formed

(iii) What type of triangle is ABC

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

$y = 2 - 2x$

x	-1	0	1	2	3
y		2			-4

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

x	-1	0	1	2	3
y	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

2. (a) The table below represents the relation $y = 3x - b$, find the value of b

x	-4	-3	-2	-1	0	2	3	4
y	-14				2			10

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

(c) Using a scale of 2cm to 1unit on the x axis and 2cm to 2units, 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

3. (a) given that $y = ax - 1$, copy and complete the table below

x	-3	-2	-1	0	1	2	3	4
y	-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.

BUSINESS MATHEMATICS

Content: percentages, simple interest, profit and loss, ratio and proportion, rate and tariffs

Predictions for 2019 BECE: profit and loss, Simple interest, ratio and proportion, rates and tariffs

SIMPLE INTEREST

a. A man took a loan from a bank. He paid GH₵1100.00 after 2years of the loan at 5% interest per annum.
   g. Calculate the principal amount he took from the bank
   h. Find the interest on the loan
   i. Find his monthly installment
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
   iii. Profit/ loss if he used the loan for a business which yield him 10% for the five year time.
c. Given that $A = P + PRT$ find P if R=10%, A=GHS1200 and T=2years

Ratio and proportion

1. 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

2. 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.
3. 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.
4. 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
5. Kofi receid GHS 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
6. 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
7. 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
8. A sales boy in a supermarket sold 10 cartons of soap and 5 bags of rice. If the items were bought at GH¢2.00 per a soap and GH¢1.00 per a cup of rice and sold them at GH¢2.50 for a soap and GH¢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
9. The population of a village is expected to increase by 10% every year. If the population of the village in 2015 was 200.

a. What will be the population of the village in 2017
b. What was the population in 2013

10. The profit of a business is expected to increase by 20% yearly. In the first year, Esi and Ataa sold 1000 quantities of goods at one for GH₵2.00 and made a cost of GH₵1.00 per item. They decided to share the profit in the ratio 2:3. If their business ended in two years.

a. How much profit will they accrue from the business
b. Find their share of the profit

11. A typist charges GH₵2.00 per page for the first 50 pages of a book and charges the remaining GH₵1.00 per page. If Mr. Nsiah contracted the typist for a 200pages book and expected to sell the book base on 20 percent increase in the total cost of typing per page of the book.
    a. Find the total amount that the typist will accrue from the typing the book
    b. Find the price of the book
    c. Calculate the profit on a book
12. A shop owner allowed a discount of 10%. If the new price of the item is GH₵90.00. Find the original price of the item.
13. In house $\frac{1}{3}$ of the people speak Twi, $\frac{1}{5}$ of the remainder speak Hausa, $\frac{1}{4}$ of what still remain speak Ga. If the remaining 10 people speak Nzema. Find the total people in the house.
14. A. a shop sells a pencil at GH¢1.50 and a pen at GH¢1.80
    ii. If Afua bought 8 pencils and 5 pens, how much did she pay altogether for them?
    iii. The price of a pencil is increased by 20% and a pen by 10%. Find how much she will pay for 10 pencils and 8 pens
15. Jones bought a car for GH¢ 6,800.00. He later put it up for sale at GH¢8,800.00. he agreed to sell it to Ruby under the following hire purchase terms

    An initial payment of 20% of price and the balance paid at 15% simple interest per annum.
    a. The amount paid every month
    b. The total amount Ruby paid for the car.
    c. The percentage profit Jones made on the cost price of the car.
16. A Kofi bought six books and ten pencils from a store. Ama bought three books and twenty-two pencils of the same kind from that store. If each of them paid ¢17,000.00 for the items, find the cost of
    i. each pencil
    ii. each book
    iii. two books and four pencils
17. The sum of three consecutive odd numbers is 27. Find the numbers

18. Mr. Adongo established a cold store business in Kumasi. At the end of the year, he summarized the operation of the business in the table below.

ITEMS	**COST/PRICE(GH¢)**
Deep freezer	20000.00
Electricity	500.00
2 containers of fish sold	50000.00
Wages/pay	8000.00
Transport	300.00
Sales of fish manure	1000.00

a. Calculate
   i. The total sales of Mr. Adongo during the year
   ii. Total cost of Mr. Adongo during the year
b. Find
   i. Average sales of a container of fish sold
   ii. The profit he made during the year
c. Find the value x $if\ 14_x = 9_{ten}$

MENSURATION AND GEOMETRY

Content: alternate and correspondent angle, polygons, volumes and total surface, area and perimeter, Pythagoras, enlargement and similarities

Prediction for 2016: alternate and corresponding angles, volume and total surface, area and perimeter

Sample questions

1. ABC is a an isosceles triangle with perimeter 30cm. if the base is 10cm
   i. Find the height of the triangle
   ii. Calculate the area of the triangle
2. The longest side of a right angle triangle is 13cm. find the opposite side if the adjacent side is 5cm. Hence find the area and perimeter of the triangle
3. A trapezium with opposite parallel side 18cm and 12cm respectively. If the area of the trapezium is $150cm^2$ find the height of the trapezium.
4. A solid cylindrical container of diameter 14cm. if the volume of the cylinder is $308cm^3$.
   i. Find the height of the cylinder
   ii. Calculate the total surface are of the cylinder.

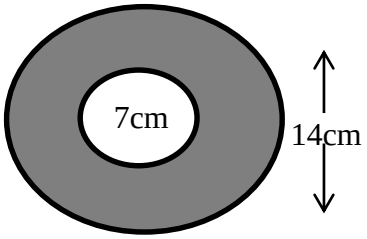
5. A water tank in a form of a cuboid with length 12m and width 5m. if the total surface area of the water tank is $460m^2$.
   i. Calculate the height of the water tank
   ii. Calculate the volume of the water tank
6. A sector subtends an angle of 60^0 at the centre of a circle of area $154cm^2$. Calculate
   i. The length of arc of the circle
   ii. The area of the sector of the circle
7. Area of sector of a circle with radius 7cm is $308cm^2$.
   i. Calculate the angle the sector subtends at the centre of the circle
   ii. Calculate the perimeter of the sector
   iii. Calculate the length of the arc of the circle
8. A rectangle with length 5m and breadth 3m. find the length of the diagonal.
9. Find the area and the perimeter of the following figures
10. A water tank in the form of a cuboid with 22m long, 14m wide, and 10m high.

i. Calculate the volume of water the tank can hold, if $\frac{2}{5}$ of the container is to be fill with water.

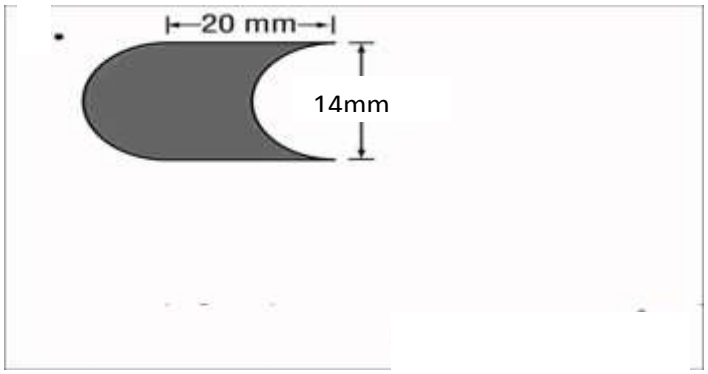
ii. A circular pan in a form of a cylinder of radius 7m and height 10m is to be used to filled the rectangular water tank, how many of such pans can filled the tank

$$\left[take\ \pi = \frac{22}{7}\right]$$

11.Find the area of the shaded portion. $[Take\ \pi = 3.142\ or \frac{22}{7}]$

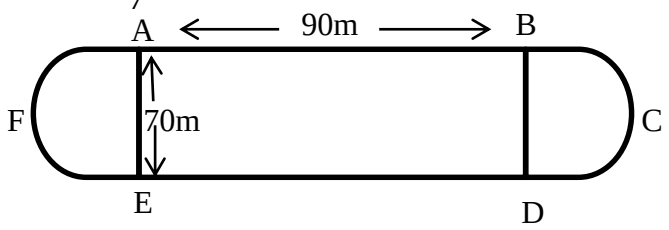


12.Calculate the area of the remaining and the perimeter

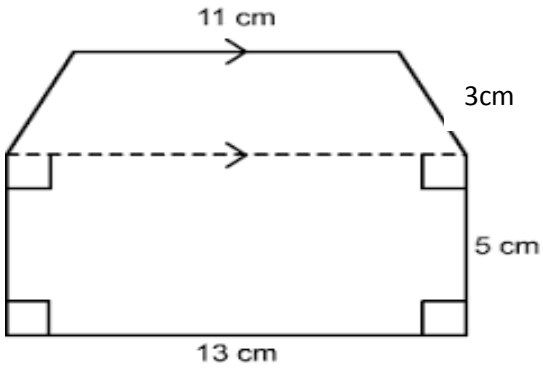


1. The diagram below shows a running track ABCDEF, AB and ED are the straight sides. The ends AFE and BCD are semi- circular shapes. AB=ED=90m and AE=BD=70m.
   a. The total length of the two semicircular ends, AFE and BCD
   b. The perimeter of the running track ABCDEFA.
   c. The total area of the running track ABCDEFA

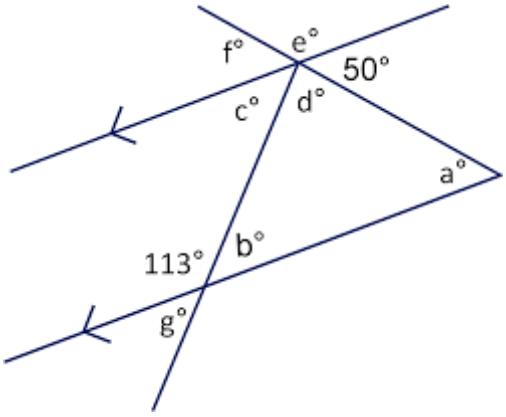
   [Take $\pi = \frac{22}{7}$]

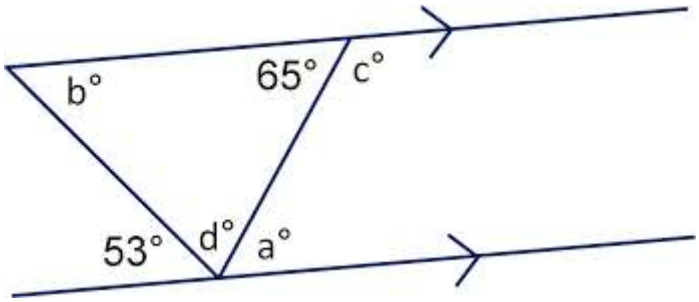


13.Calculate the area and the perimeter

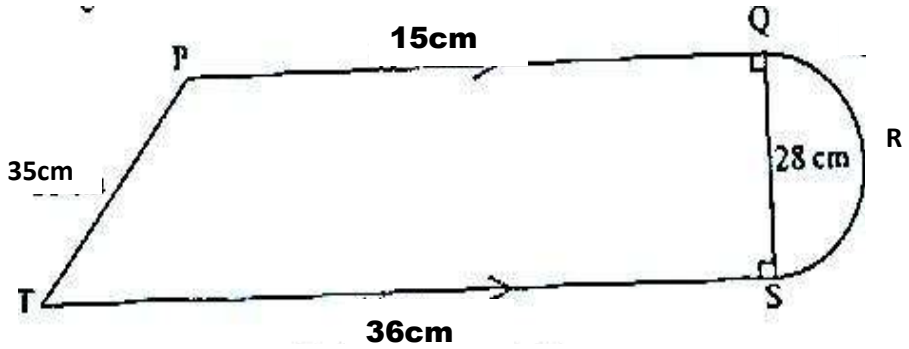


14.Find the value of the angles lettered





(a) The diagram shows a trapezium with semi-circle portion **QRS**



NOT DRAWN TO SCALE

Find

i. Perimeter of the figure **PTSRQ**

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

MISCELLANEOUS

Equation

1. Solve $\frac{2(x+5)}{3} - 4 + \frac{1}{4}x = \frac{2x}{5} + 6$

Inequalities

2. Find the truth set $3\frac{1}{4} + (x+5) \geq \frac{3(3x-5)}{2} - 3$. Illustrate the result on a number line.

Vectors

3a. given $t = \binom{10}{4}, p = \binom{7}{8}\ and\ s = \binom{x}{y}$

i. $find\ s\ if\ t - p = s$

ii. The magnitude of s

c. Solve $\binom{2x+6}{y+5} + \binom{x-3}{2y-1} = \binom{-9}{-8}$

algebra

Change of subject

a. Given $\frac{1}{c} + \frac{2}{p} = \frac{3}{t}$, express p in terms of c and t. hence find the value of p if c=10 and t=2

b. Factorize completely 2ap+aq-bq-2bp

c. Simplify $\frac{2m+4m}{3} - \frac{3(a-b)}{2}$

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

e. Simplify $3\frac{1}{5}\ of\ \left(\frac{3}{7}+\frac{1}{4}\right) \div 2\frac{3}{8}$

f. Simplify $\frac{8\times1\times2^3}{27}\ by\ \frac{81}{16}$ leaving the answer in index form

g. Evaluate $\frac{0.0028\times0.0084}{0.07\times0.0042}$ leaving the answer in standard form

OPERATIONS AND SETS

1. In a class of 50 students the number of those who like mathematics are 5 more than those who like science. The number of students who likes science is twice those who like mathematics and science. If 15 students like mathematics and science.
   h. Illustrate the information on a venn diagram
   i. Find the number of student who like mathematics
   j. Find the student who like only one subject
2. U, A and B are sets such that A and B are subsets of U.
   U={$whole\ numbers\ less\ than\ 30$)
   A=(multiples of 3)
   B=(composite numbers)
   i. List the members of U,A and B
   ii. Find the elements of i. A∪B, II. A∩ B III. A^1, B^1
   iii. Illustrate U, A and B on a venn diagram
1. a. 25 students in a class took an examination in mathematics and science. 17 of them passed in science and 8 passed in both subjects. 3 students did not pass in any of the subjects.
   i. Illustrate the information on a venn diagram
   ii. How many passed in mathematics
   iii. The probability of meeting a student who passed in one subject only.
1. a. There are 20 students in Grace hostel, 16 of them are good at Mathematics and 10 of them are good at Science. Each student is either good at mathematics or science.

i. Draw a venn diagram to represent the information.

ii. How many students are good in both subjects?

2. . In a survey conducted in a school of 50 people, 35 read Mathematics and 20 read Economics. 10 read neither of the two subjects.

i. Illustrate the above information on a venn diagram

ii. How many students read both subjects

iii. How many students read only one subject.

NUMBER BASES

a. copy and complete the table below in base 2

+	1	2	3	4
1	10			
2				
3				
4				

iii. use the table to evaluate 4+4

b. find the value x $if\ 14_x = 29_{ten}$

c. convert 123_{five} to base ten

1. A car leaves Kumasi at 8.00am and arrives in Accra at 1.30pm. If the distance is 240 km, find the average speed.
2. A car leaves port A at 8.30am and arrives in port B at 5.30am. If the car travels at an average speed of 75 km/hr, how far is it from A to B?

PAPER 1

TREND ANALYSIS

TOPICS	NUMBER
set	**2**
integers	**1**

indices	**1 or 2**
fraction	**1**
Number bases	**1**
Change of subject	**1**
Algebra	**2-4**
Equation inequality	**2-3**
proportion	**1-2**
Business math	**3-5**
mapping	**1-2**
Vectors	**1-2**
Sequence	**1**
Mensuration	**4-6**
statistics	**2-3**
probability	**1**
Scale	**1-2**
Rigid motion	**1-2**

ACTION PLAN: solve the topics from the past questions

SETS

1. If Q= $\{1,3,5,7,9,11,13,15\}$ and R=$\{1,2,3,5,6,7,10,11,12\}$ find Q∩ R
   A. $\{1,3,5,7,17\}$ $B.\{1,3,5,7,11\}$ $C.\{2,4,8,9,13,14\}$ $D.\{1,2,3,5,6,7,9,10,11,12\}$

2. If x is an integer, list the members of set$\{2 \leq x < 10\}$
   A. $\{3,4,5,6,7,8,9\}$ $B.\{2,3,4,5,6,7,8,9\}$ $C.$ $\{3,4,5,6,7,8,9,10\}$ $D.\{2,3,4,5,6,7,8,9,10\}$

3. List the members of the set p=$\{factors\ of\ 30\ which\ are\ odd\}$
   A. $\{2,3,5\}$ $B.\{1,2,3,5\}$ $C.\{1,3,5,15\}$ $D.\{2,6,10,30\}$

4. M= $\{g,o,q,s\}$ and W=$\{h,p,r,t\}$. Find M∪ W
   A. $\{q,r,s,t\}$ $B.\{g,h,o,q,r\}$ $C.\{g,h,o,q,r,t\}$ $D.\{g,h,o,p,q,r,s,t\}$

5. Which of the following sets is well defined?
   A. $\{Man\ ,kofi,red,14\}$ $B.\{ink,mango,green,nail\}$ $C.\{car,road,glass,book\}$
   D. $\{seth,mary,Jacob,evelyn\}$

6. If set B is a subset of set A, then
   A. Set A and B have the same number of elements B. Some members of set B can be found in set A C. No members of B is in set A
   D. All members of set B are in set A

7. Given that A=$\{a,e,i,o,u\}$ and B =$\{r,s,t\}$, how many elements will be in A∩ B
   A. 0 B. 2 C. 1 D. 3
8. If W=$\{1,2,3,4\}$. Find the number of subsets of P
   A. 4 B. 8 C. 32 D. 16

DECIMALS, APPROXIMATION, STANDARD FORM

9. Correct 0.003858 to three significant figures
   A. 0.00385 B. 0.00386 C. 0.0039 D. 386

10. Round 8,921,465 to the nearest hundred
   A. 8,921,000 B. 8,921,400 C. 8,921,460 D. 8,921,500

11. What is the value of four in the number 7073.43?
   A. Four tenth B. Four C. Forty D. Four hundred
12. Correct 0.02751 to three decimal places
   A. 0.027 B.0.028 C. 0.03 D. 0.28
13. What is the value of 7 in the number 46878
   A. Seven thousand B. Seven hundred C. Seventy D. seven
14. Express 962 in standard form
   A. 9.62×10^2 $B.$ 9.62$\times$ 10 $C.0.962 \times 10^3$ $D.0.0962 \times 10^4$

15. Simplify 200× 0.01×372 leaving the answer in standard form

A. 74.4×10^1 $B.$ 7.44×10^1 C. 7.44×10^2 D. 7.44×10^3

16. Find the sum of 124.3, 0.275 and 74.06(correct to one decimal place)

A. 198.6 B. 198.7 C. 892.0 D. 892.4

17. Express $\frac{5}{16}$ as a decimal fraction

A. O.3333 B. 0.3125 C. 0.2667 D. 0.2500

18. Write 0.55 as fraction in its lowest term

A. $^{11}/_{200}$ B. $^{11}/_{20}$ $C.$ $^{11}/_{2}$ $D.$ $^{11}/_{5}$

19. Subtract 125.47 from 203.90

A. 78.57 B. 78.43 C. -121.57 D. -122.38

20. Express 1.25 as a percentage

A. 125% B. 25% C. 1.25% D. 17

FRACTION, NUMBERS, BASES, INDICES

21. Simplify $^{4}/_{3}x - {}^{2}/_{9}x$ $A.$ $^{2}/_{9}x$ B. $^{2}/_{3}x$ C. $^{10}/_{9}x$ D. $^{14}/_{9}x$

22. Express 350 as a product of prime factors

A. $2\times 5 \times 7$ B. $2 \times 5^2 \times 7$ C. $2 \times 5 \times 7^2$ D. $2^2 \times 5 \times 7$

23. Arrange the fraction $\frac{3}{4}, \frac{2}{3}, \frac{4}{5}$ in ascending order of magnitude

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

24. Arrange the following fractions from highest to the lowest $\frac{5}{6}, \frac{4}{5}, \frac{4}{7}$

A. $\frac{4}{7}, \frac{4}{5}, \frac{5}{6}$ B. $\frac{4}{5}, \frac{5}{6}, \frac{4}{5}$ C. $\frac{5}{6}, \frac{4}{5}, \frac{4}{7}$ D. $\frac{4}{7}, \frac{5}{6}, \frac{4}{5}$

25. Arrange the following in descending order of magnitude

0.32, $\frac{2}{3}$, 27%, $\frac{1}{3}$

A. 0.32, $\frac{2}{3}$, 27%, $\frac{1}{3}$ B. 0.32, $\frac{1}{3}$, $\frac{2}{3}$, 27% C. 27% , 0.32, $\frac{1}{3}$, $\frac{2}{3}$ D. $\frac{2}{3}$, $\frac{1}{3}$, 0.32, 27%

26. Express 87_{ten} as a base five numeral

A. 302_5 B. 322_5 C. 3022_5 D. 3202_5

27. Convert 2114_{five} to base ten numeral

A. 194 B. 280 C. 284 D. 300

28. Find the difference between 423_{five} and 143_{five}

A. 230_{five} B. 334_{five} C. 1130_{five} D. 1310_{five}

29. Evaluate $\frac{2^3\times3^4\times3^3}{2^3\times2\times3^5}$

A. 6 B. 4.5 C. 12. D. 18

30. Find the highest common factor (HCF) of 20,12 and 28

A. 2 B. 4 C. 8 D. 12

31. Find the least common multiple (LCM) of 4,5 and 6

A. 20 B. 24 C. 30 D. 60

32. 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. $3^5 \times 5^6$

33. Find the lowest common multiple (LCM) of $2^2 \times 3 \times 5^2$ and $2^3 \times 3^2 \times 5$

A. $2^2 \times 3 \times 5$ B. $2^2 \times 3^3 \times 5^2$ C. $2^3 \times 3 \times 5$ D. $2^3 \times 3^2 \times 5^2$

RATIO, PROPORTION, PERCENTAGES AND BUSINESS MATHEMATICS

34. The number of boys in a school is 120. If the ratio of boys to girls is 5:7, find the total number of students in the school.

A. 240 B. 288 C. 600 D. 840

35. A train travels at a speed of 80km per hour. How long will it take to travel a distance of 320km?

A. 2hours B. 3 hours c. 4 hours D. 5 hours

36. In an examination, 154 out of 175 candidates passed. What percentage failed?

A. 6% B. 12% C. 13% D. 18%

37. What percentage of 5 is 0.25?

A. 4% B. 5% C. 20% D. 25%

38. An amount of 5400 is shared among three sisters in the ratio of their ages. Their ages are 10 years, 6 years and 2 years . find the share of the youngest sister

A. 300 B. 600 C. 1200 D. 1800

39. In a town of 42,800 inhabitants, 48% are male. The rest are female. How many more females are there than males

A. 22,256 B. 20,544 C. 1712 D. 1,612

40. It takes 6 students 1 hour to sweep their school compound . how long will it take 15 students to sweep the same compound

A. 24 minutes B. 12 minutes C. 3 hours D. 2 hours

41. 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. 0.5km B. 5km C. 50km D. 500km

42. Kofi invested 150,000 Ghana cedi at 2.5% per annum simple interest. How long will it take this amount to yield an interest of 11,250 Ghana cedi

A. 2years B. 3years C. 4years D. 5years

43. A housing agent makes a commission of GHS103,500 when he sells a house for GHS690.00. Calculate the percentage of the commission

A. 15% B. 10% C. 7.5% D. 5%

ALGEBRA AND INTEGERS

44. Solve the equation $\frac{x+2}{3} + 2x = 10$

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

45. Simplify $\frac{36a^3b^2x}{27ab^3y}$

46. A. $\frac{4a^2x}{3by}$ B. $\frac{4abx}{3y}$ C. $\frac{4a^2bx}{3y}$ D. $\frac{4a^4b^5x}{3y}$

47. Factorize xy+5x+2y+10

A. (x+5)(2y+10) B. (x+2)(y+10) C. (x+5)(y+2) D. (x+2)(y+5)

48. Simplify $\frac{3x}{4} - \frac{x-y}{3}$

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

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

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

50. If $R = \frac{h}{2} + \frac{d^2}{8h}$, find R when d=8 and h= 6

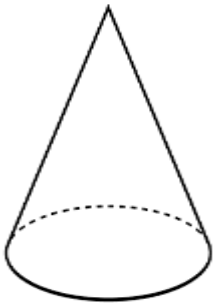
A. $3\frac{1}{6}$ B.$4\frac{1}{3}$ C. $4\frac{3}{4}$ D. $4\frac{9}{16}$

51. Make h the subject in $h = \frac{1}{2}(a+b)h$

A. $h = \frac{2A}{a+b}$ B. $\frac{2A}{a-b}$ C. $\frac{2A}{2a-b}$ D. $\frac{2A}{a-2b}$

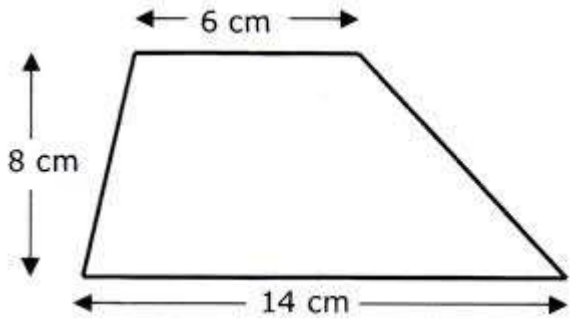
GEOMETRY

52. Name the geometric figure below



A. Cuboid B. Cone C. Pyramid D. Sphere

53.



Calculate the area of the trapezium

A. $60cm^2$ B. $80cm^2$ C. $100cm^2$ D. $50cm^2$

54. A square of side 6cm has the same area as a rectangle of length 9cm. find the breadth of the rectangle

A. 3cm B. 4cm C. 6cm D. 24cm

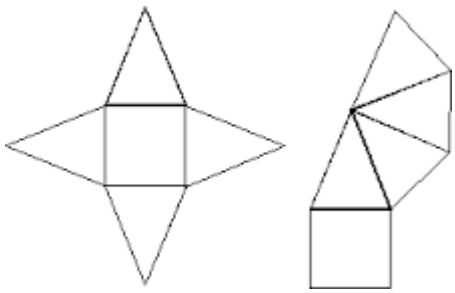
55. The length of a rectangular playing field is 5m longer than its width. If the perimeter of the field is 150m. find the width

A. 30m B. 35m C. 40m D. 45m

56. How many faces has a triangular pyramid

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

57. Which solid figure can be made from the net below?



A. Square prism
B. Square pyramid
C. Triangular pyramid
D. Cuboid

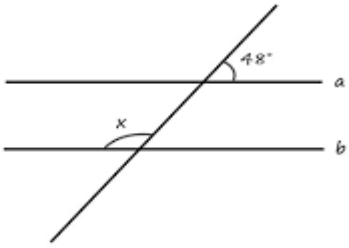
58. The interior angle of regular polygon is 120 degrees. How many sides has this polygon

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

59. Find the perimeter of circle of diameter 14cm

A. 11cm B. 22cm C. 154 cm D. 28cm

60. Find the value of x



A. 48 B. 132 C. 102 D.78

B.

61. If r= $\binom{2}{-5}$ and s = $\binom{-2}{5}$, calculate 2r-3s

A. $\binom{-10}{-25}$ B. $\binom{-2}{-25}$ C. $\binom{10}{-25}$ D. $\binom{10}{25}$

62. Find the gradient of A(2,4) and C(-2,-4)

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

63. Find the rule of the mapping

1 2 3 4 5 -------x

↓ ↓ ↓ ↓ ↓ ↓

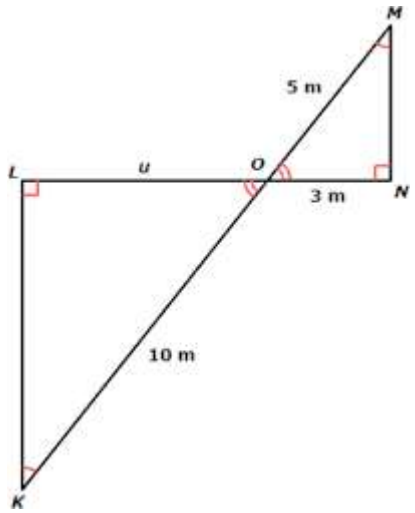
7 11 15 19 23 y

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

64. Find the image of 3 under $y = 3x - 3$

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

In the figure, triangle KLO is an enlargement of triangle MNO. Use it to answer question 65 and 66



65. Find the scale factor

A. 2 B. 3 C. 4 D.5

66. Find the value of u

A. 8cm B. 4cm C. 2cm D. 5cm

STATISTICS AND PROBABILITY

Ages (years)	13	14	15	16	17
Number of students	3	10	6	7	4

67. How many students are in the class

A. 20 B. 30 C. 45 D. 75

68. What is the modal age

A. 14 B. 15 C. 16 D. 17

69. If a student is chosen at random from the class, what is probability that student is 15 years.

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

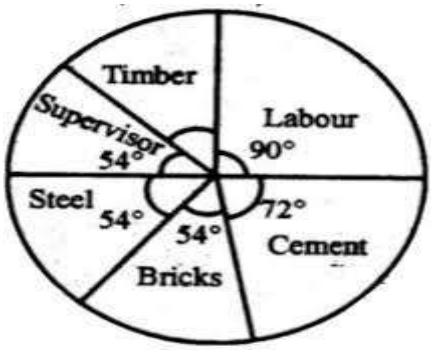
70. Eighteen cards are numbered from 11 to 29. If a card is chosen at random what is the probability that it contains digit 2

A. $\frac{3}{9}$ B. $\frac{7}{18}$ C. $\frac{5}{9}$ D. $\frac{11}{18}$

71. A box contains 30 identical balls of which 16 are white and the rest yellow. If a girl picks a ball at random from the box, what is the probability of obtaining a yellow ball

A. $\frac{1}{16}$ B. $\frac{1}{16}$ C. $\frac{1}{16}$ D. $\frac{1}{16}$

Use the pie chart below to answer the questions that follows



72.

Find the value of angle for timber

A. 35 B. 36 C. 38 D. 40

73.If 1800 Ghana cedis was used for the purchase of the items, what will be the amount for labour.

A. 450GHS B. 500GHS C. 600GHS D. 800GHS