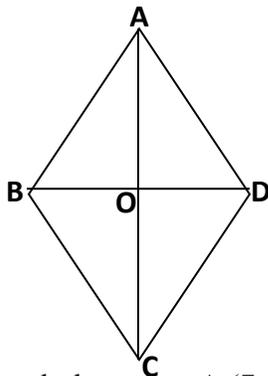


S.3 MATHEMATICS HOLIDAY WORK TERM 3 2015.

- Simplify: $\frac{1\frac{1}{2} - \left(8\frac{1}{3} \div 2\frac{1}{4}\right)}{1\frac{1}{5} \text{ of } \left(1\frac{1}{4} + 1\frac{3}{3}\right)}$
- y is inversely proportional to the square of x . When x is **3**, $y = 8$. Calculate the value of y when x is **6**.
- Without using tables: Find the value of **K**.
 $\log\left(\frac{11}{2}\right) + 2\log\left(\frac{4}{11}\right) - \log\left(\frac{5}{22}\right) = \log K - \log 10.$
- The position vectors of **P** and **Q** are $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\begin{pmatrix} 5 \\ 7 \end{pmatrix}$ respectively.
 Determine the length of **PQ**.
- An article is sold at **3000** shillings and a seller makes a profit of **25%**. How many articles must the seller sell in order to make a profit of **Shs.10,800**?
- Express: $\left(\frac{3}{3\sqrt{2}-2\sqrt{5}}\right) - \left(\frac{1}{3\sqrt{2}+2\sqrt{5}}\right)$ in the form $a\sqrt{2} + b\sqrt{5}$. State the values of **a** and **b**.
- Given that: **P** = {Triangular numbers between **8** and **40**}
Q = {Square numbers between **8** and **40**}
 Find: (i) **P** ∩ **Q** (ii) $n(\mathbf{P} \cap \mathbf{Q})$

- The figure below represents a kite **ABCD**. $AB = 15\text{cm}$. The diagonals **BD** and **AC** intersect at point "**O**". Given that $AC = 30\text{cm}$ and $AO = 12\text{cm}$; find the area of the kite.



- A line passing through the points **A** (7, **K**) and **B** (4, 5) is perpendicular to the line $5y + 3x = 10$. Find the value of **K**.
- Solve the inequality $x + 5 \leq 4x + 2 \leq 3x + 6$ and show the solutions on a number line.
- A total of **100** vehicles were inspected and **60** vehicles passed the road worthy test. The rest of the vehicles (remainder) had faults in: Brakes (**B**), Lights (**L**) and steering (**S**) as follows:-
 $n(B \cap L \cap S) = 3$; $n(B \cap S^I \cap L^I) = 12$; $n(B \cap S) = 5$; $n(B \cap L) = 8$;
 $n(S \cap L \cap B^I) = 2$ and $n(S \cap L^I \cap B^I) = n(L \cap B^I \cap B^I)$.
 (a) Represent the given information on a Venn-diagram.

- (b) How many vehicles had:
- i. Faulty steering.
 - ii. One fault only.
- (c) If a vehicle is chosen at random; find the probability that it had at least **two** faults.

12. Two taxis **A** and **B** move off from rest in the same direction on a straight road.

The speed of taxi **A** increases at a uniform rate of **2m/s** while taxi **B** moves as shown in the table below:

Time (s)	0	1	2	3	4	5	6	7	8
Speed (m/s)	0	0.5	1.5	4	10	15	18	19.5	20

- (a) Draw on the same axes the speed-time graphs of taxis **A** and **B** using the scale of **1cm** to represent **1** second on the x-axis and **1cm** to represent **2m/s** on the y-axis.
- (b) Using the graphs in (a) above, find the;-
- (i) time and speed when taxi **B** overtook taxi **A**.
 - (ii) difference in the speed of the vehicles after **6** seconds.
 - (iii) distance covered by taxi **A**.

13. In a certain country, the income tax is levied after the allowances have been deducted. The allowances which include Three **3**) children to a married man are as follows:

Marriage allowance = $\frac{1}{6}$ of the monthly income.

Unmarried allowance = 15,000/= per month.

Transport allowance = 500/= per day.

Medical allowance = 480,000/= per annum.

Insurance premium = 10,000/= per month.

Each child below 10 years = 12,000/=

Each child above 10 years but below 20 years = 7,000/=

Mr. Kasekende is married with **two** children below 10 years and **three** children above 10 years but below 20 years. Mr. Kasekende earns a **gross annual income** of **3.6** million.

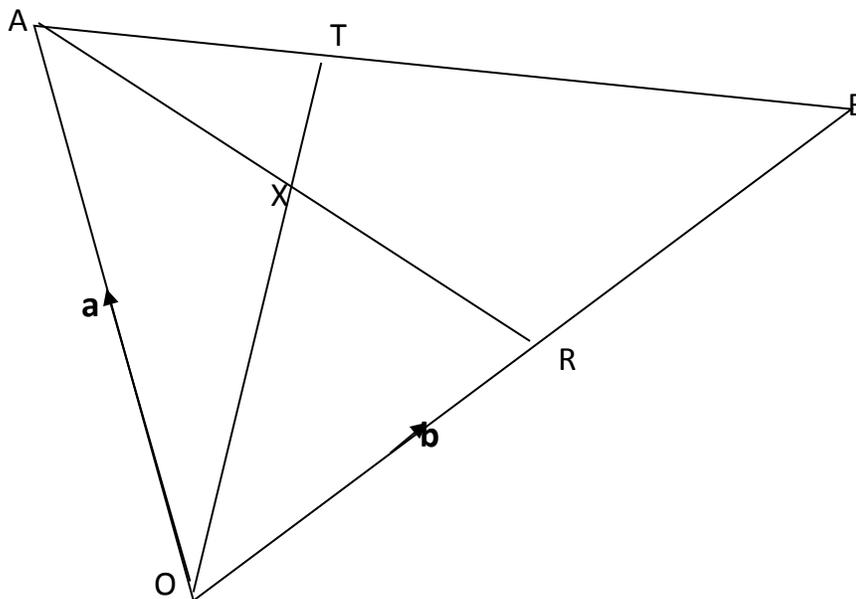
The income tax structure for the country is shown in the table below:

Taxable income	Tax rate (%)
50,001 – 60,000	10
60,0001 – 85,000	15
85,001 – 105,00	28
Above 105,000	45

- (a) Calculate Mr. Kasekende’s taxable income during the month of “**December**”
 (b) Calculate his income tax during the month of “**December**”
 (c) Express the income tax he pays as a percentage of his monthly income.

14. (a) The ages of Irene and Rita are in the ratio of **15 : 8** respectively. In ten years, the ratio of Irene’s age to Rita’s age will be **5 : 3**. Find;-
 i. the present ages of Irene and Rita.
 ii. If “**t**” years ago Irene was **five** times as old as Rita, find the value of **t**.
- (b) **Six** men can cultivate an area of **280m²** in 2 hours. What area would **five** men cultivate in 3 hours working at the same rate?

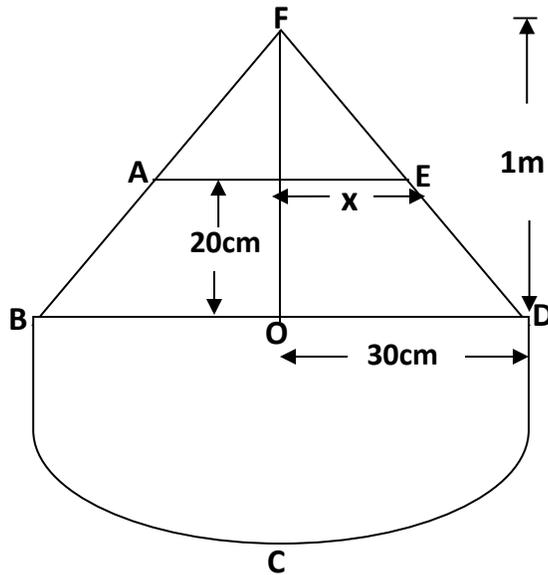
15. The figure below shows a triangle **OAB** in which point **R** is the mid-point of **OB**.
 Given that: $OA = \mathbf{a}$; $OB = \mathbf{b}$; $AT : TB = 1 : 2$.



- (a) Find in terms of **a** and **b**, the vectors;
 (i) **AB** (ii) **AT** (iii) **OT** (iv) **AR**
- (b) Given that $\overrightarrow{AX} = k \overrightarrow{AR}$ and $\overrightarrow{OX} = l \overrightarrow{OT}$; Find \overrightarrow{OX} in terms of:

- i. a , b and k .
- ii. a , b and l . hence find the values of k and l .

16.



ABCDE represents the cross-section of the bowls of a concrete mixer. **ABDE** is the remaining part of the cone **FBD** of base with radius **30cm**. The cone **FAE** of base with radius "**x**"**cm** is removed. Calculate;-

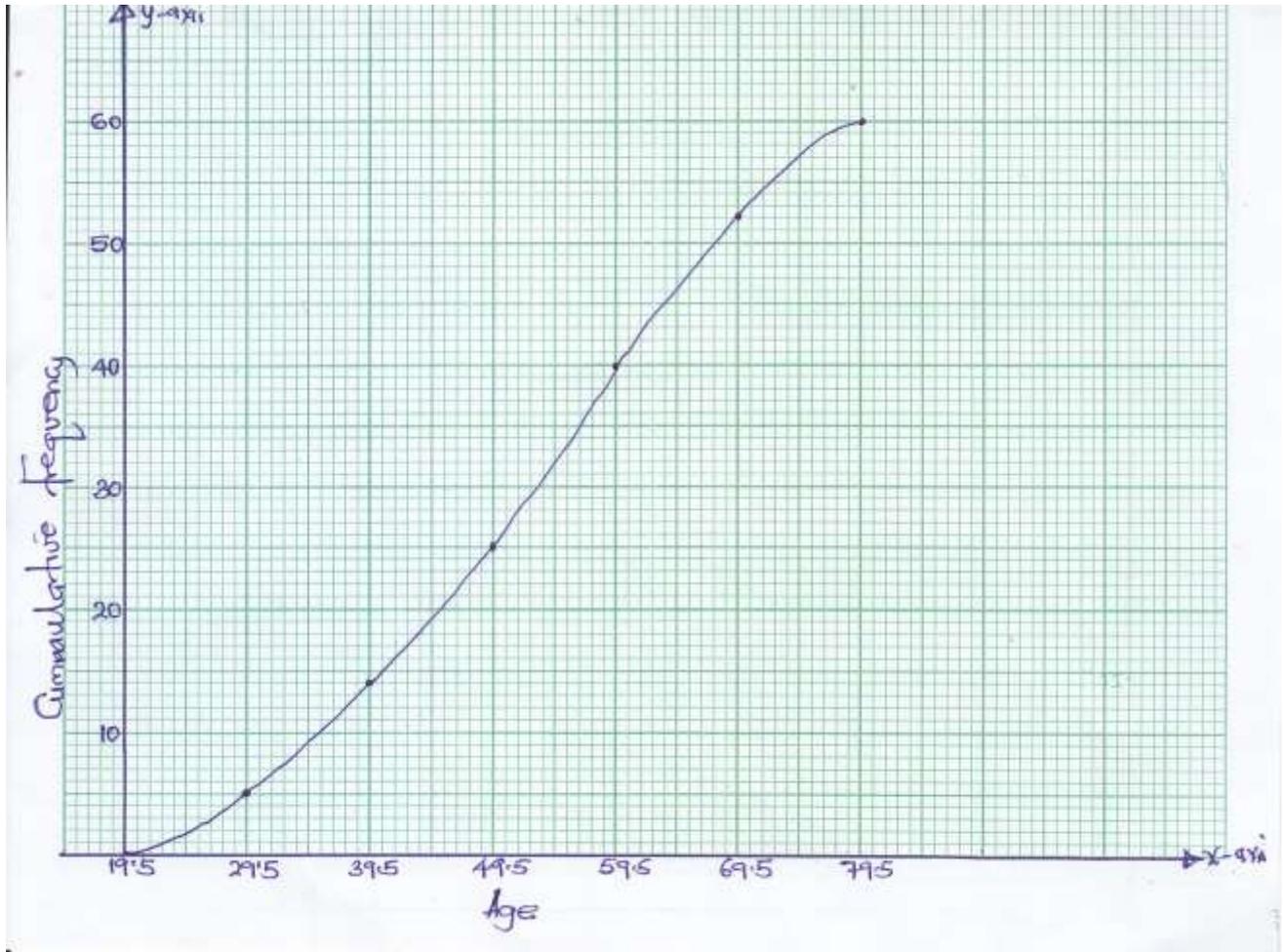
- i. the value of x .
 - ii. the volume of **ABDE**.
 - iii. the volume of the whole concrete mixer bowl.
17. (a) Construct a table of values for $y = (2x + 3)(4 - x)$ for $-3 \leq x \leq 6$.
- (b) Use your table of values to draw the graph of $y = (2x + 3)(4 - x)$.
- (c) i) State the maximum value of y .
- ii) Use the graph to solve $(2x + 3)(4 - x) + 5 = 0$.

18. (a) Solve the simultaneous equations:
- $$\begin{aligned} xy - x^2 &= -24 \\ x - y &= 8 \end{aligned}$$

(b) If $\begin{pmatrix} 4 & a \\ -2 & 1 \end{pmatrix} \begin{pmatrix} b \\ 5 \end{pmatrix} = \begin{pmatrix} -7 \\ 1 \end{pmatrix}$, find the values of a and b .

(c) Point $A(4,3)$ was mapped onto $A'(-2,0)$ after an enlargement of scale factor -2 . Find the coordinates of the centre of enlargement.

19. The diagram below shows the number of people by age who turned up for the National identity card registration at Gayaza Zone B.



Study the diagram and use it to;

- (i) find the median age of the people who registered
- (ii) prepare a frequency distribution table from the diagram above and state the modal frequency
- (iii) calculate the mean age.

20. Members in an organization formed a loan scheme in which the interest rate on a loan is 4% per month declining balance (interest calculated on the unpaid balance). Mirembe got a loan of Shs. 1.6 million on 2nd November 2014. She was able to pay back Shs. 300,000 by 2nd of each following month.

- (a) What is the unpaid balance by the 3rd February 2015?
- (b) If on the 2nd March 2015, she cleared the loan and its interests. How much did she pay?
- (c) How much interest did she pay for the loan?

Wish you a pleasant holiday