STATISTICS SIMPLIFIED: MHS GEOGRAPHY DEPARTMENT 2021

- Learners who understand and practice statistical questions and graphs easy pass Geography because once understood it's permanent.

- All you need to do is to know the following things when dealing with statistical questions.

1. Determining of both the Vertical scale and the Horizontal scale.

2. Be consistent when plotting the values i.e if the scale is 1cm represents 50 mm of rainfall.
   Then you must keep adding 50 mm for every 1cm e.g 50,100,150,200 …. But not 50, 80,100,150. This makes accuracy impossible.

3. Make sure you use 1cm and understand how long a centimeter is. Many learners call 2cm 1cm which distorts their work.

4. Know the following simple calculations with their formulae:

   a) Percentage change $= \frac{\text{NEW}-\text{OLD X } 100\%}{\text{OLD}}$

   b) Percentage decrease $= \frac{\text{OLD}-\text{NEW X } 100\%}{\text{OLD}}$

   c) Relative importance $= \frac{\text{x}}{\text{TOTAL}} \text{ X } 100\%$

   d) Percentage contribution $= \frac{\text{x}}{\text{TOTAL}} \text{ X } 100\%$

   e) Population density $= \frac{\text{Population}}{\text{Total Land Area}}$

Note: All the above calculations you must show the formulae and their units e.g persons per square kilometer (KM^2).

5. Determining the vertical scale:

- The vertical scale all bars or points must start from zero.

- To easily establish the Vertical scale do the following simple steps:
  a) All graph papers are roughly 22 cm (have 22 boxes)
  b) From the table given, identify the biggest value (figure).
  c) Divide the biggest value from the table i.e by 20cm
  d) For example if the biggest value is 1,000,000 divide it by 20cm to get 5000.
  e) So the scale becomes 1cm represents 5000.
  f) To be more accurate, divide the scale by 5 (smallest boxes in each centimeter) to get 1000.
  g) This means the smallest box will represent 1000.
  h) This will bring out your accuracy in the plotting. Remember each accurate plotting is awarded a mark.

6. For horizontal scale should be also given to state what each centimeter represents. I.e 1cm represents 1 month of the year.

Important to Note: The following when using a scale with decimal points:

- Such a scale is not convenient and affects your accuracy leading to loss marks on the graph.
- A scale with decimal points can be modified to a convenient figure that make your plotting easy i.e
- Take as an example if the biggest figure in the table is 472,350 divided by 20 cm to get 23617.5.
- Such a scale can be modified to a convenient figure such as 25000, 22000, and 20000.
- So the scale becomes 1cm represents 25000 or the other two figures.
- You must maintain that scale. The first plotting after zero will be 25000, 50, 000, 75,000,100,000, 125000….
- For purposes of accuracy divide the scale by 5 (smallest boxes representing 1cm) to get 5000. Meaning the smallest box will be 5000.

PROCEDURES TAKEN WHEN DRAWING THE FOLLOWING GRAPHS:

a) A simple Line graph (Curve graph):

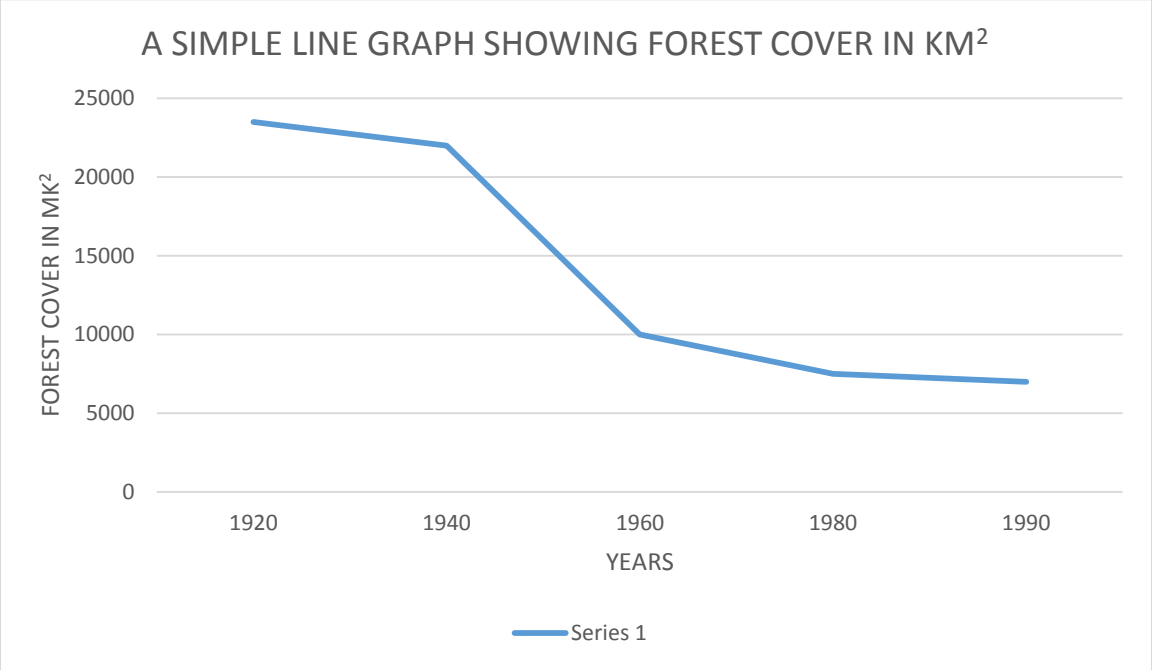
- Independent variables i.e months, years, crops are put on horizontal axis.
- Dependent variables (Quantities) i.e degrees, percentage, amounts, tonnes are put on the vertical axis.
- On the vertical scale (axis) values must start at zero and the top should be slightly higher than maximum value in the table.

- Avoid using big values i.e 2,000,000 knock off some zero e.g to get 2,000,000 to become 2,000.
- When plotting, use small dots which disappear when you join the curve.
- Join the points with a straight line using a ruler.

1. Study table 1 below showing forest cover in KM2

Years	1920	1940	1960	1980	1990
Forest cover Km2	23500	22000	10000	7500	7000

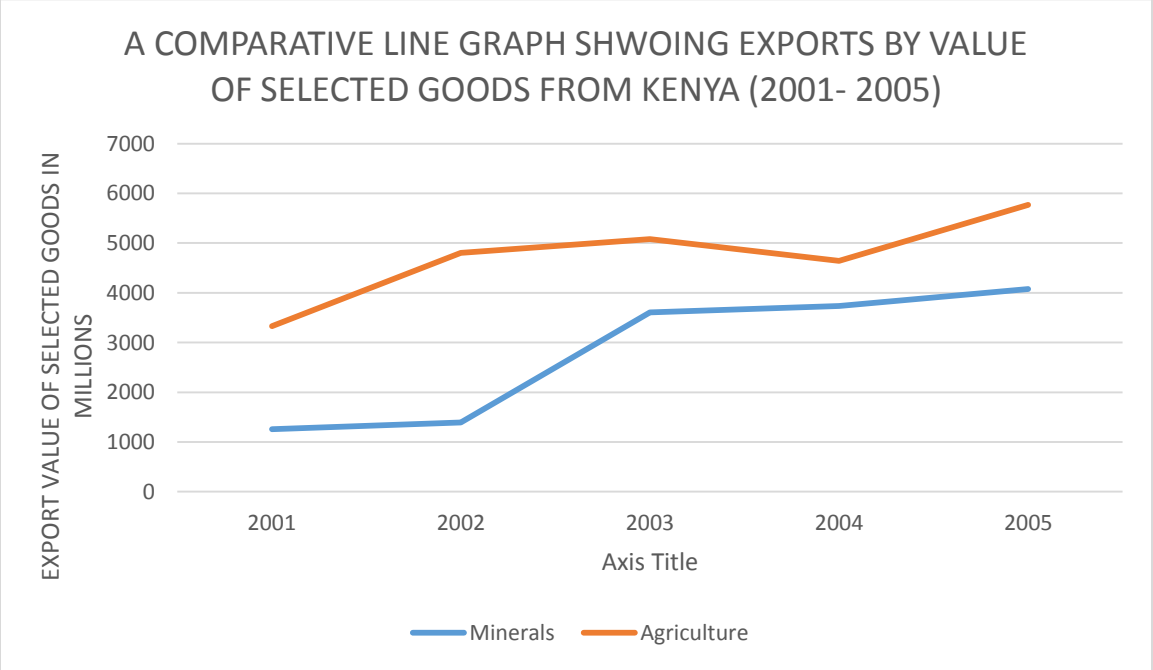
a) Draw a line graph to show the information in the table above



2. Study table 2 showing exports by value for selected goods from Kenya

Years	2001	2002	2003	2004	2005
Minerals	1254	1393	3605	3735	4078
Agriculture	3332	4802	5079	4639	5795

a) Draw a comparative line graph to show the exports by value of selected goods in Kenya.



b) A simple bar graph:

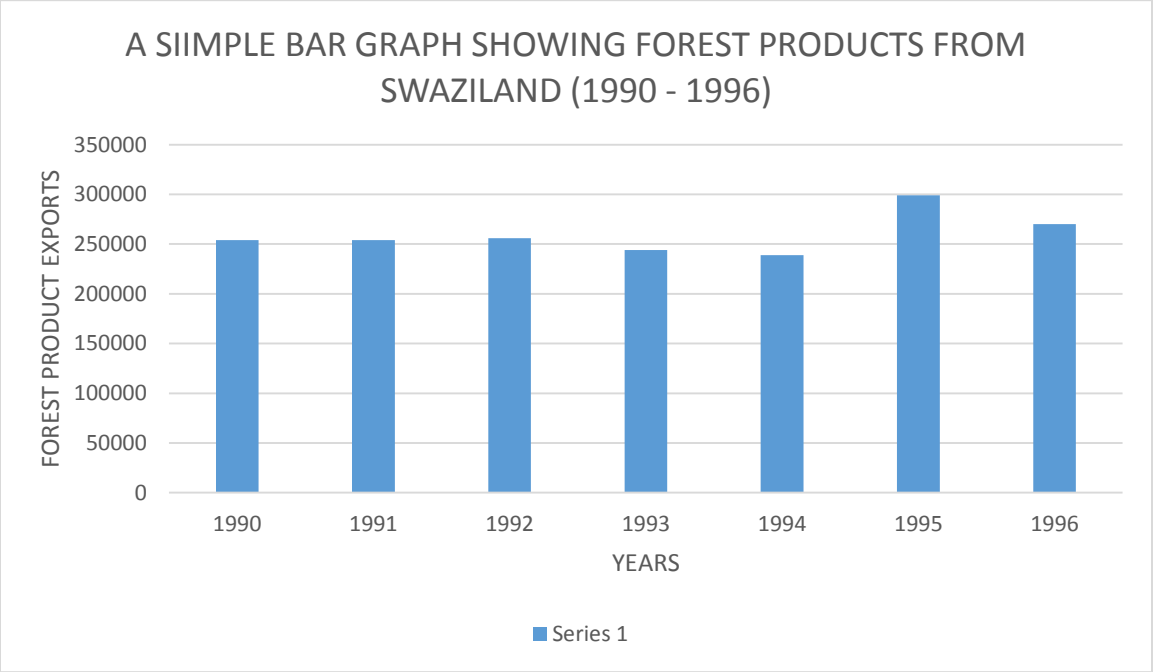
- Vertical axis represents the dependent variables such as volume, percentages, and tonnes.
- Horizontal scale is for independent variables like years, countries, crops.
- All bars start from zero and they don't touch one another.
- The height of each independent bar represents a percentage or volume.
- Equal space should be left between each bar and the vertical axis.
- The bars should be of the same with, similarly spaces between the bars should be uniform.
- The bars must have both vertical and horizontal scales on the graph paper.

Note: A graph without a scale is useless, you lose more than 06 marks when you forget the scale.

A table below showing forest products exported from Swaziland between 1990 to 1996.

Year	Forest product exports
1990	254,000
1991	254,000
1992	256,000
1993	244,000
1994	239,000
1995	299,000
1996	270,000

a) Draw a simple bar graph to show the information given in the table above.



A table below showing deforestation in selected countries in Africa between 2010 and 2015 in hectares.

Country	2010 (Hectares)	2015 9Hectares)
Algeria	10,000	4,000
Swaziland	40,000	27,000
Tanzania	19,000	4,000
Uganda	28,000	5,000
DR Congo	114,000	58,000

a) Draw a comparative bar graph to show the information given in the table above.

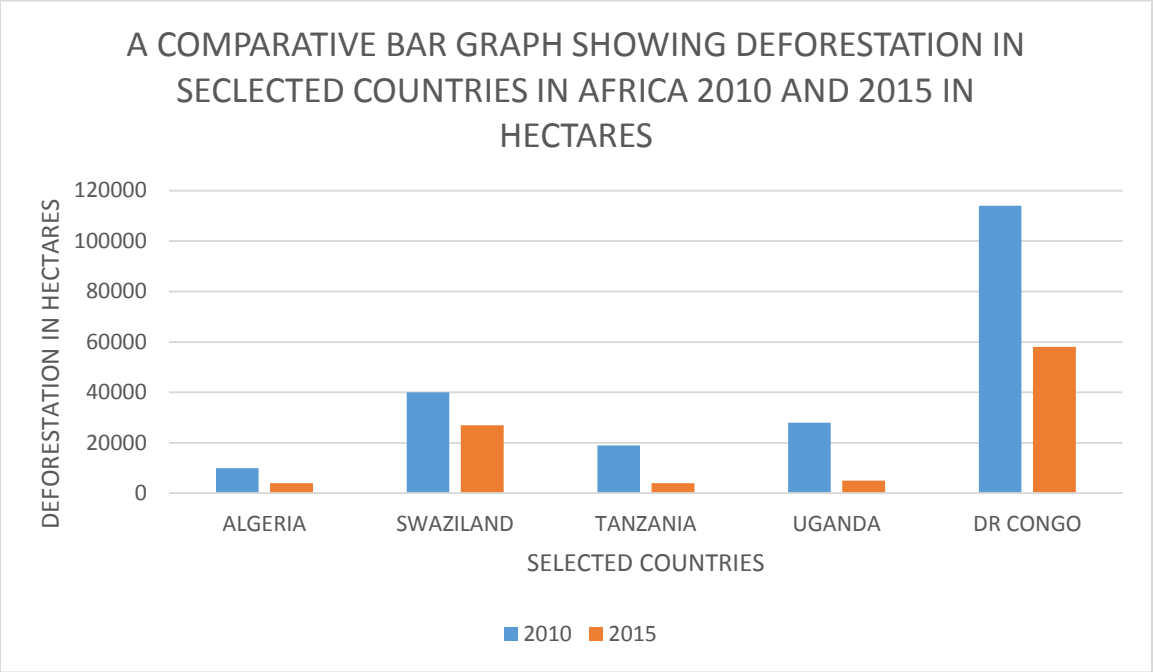
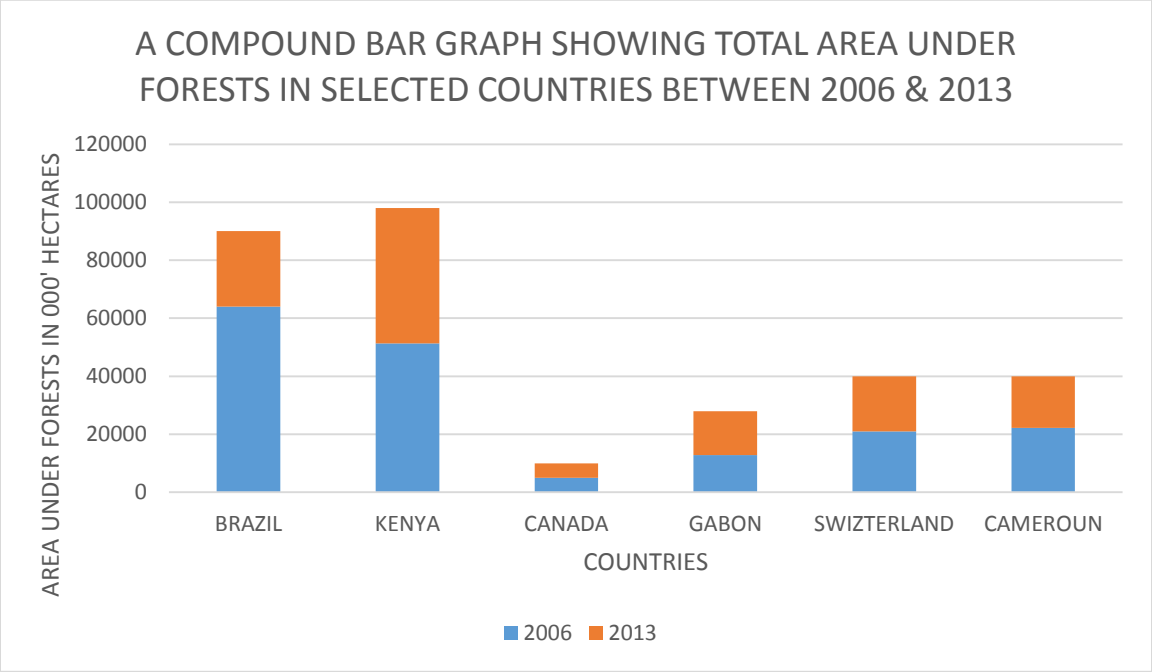


Table below shows total area under forests in selected countries between 2006 and 2013 in 000's hectares.

Countries	2006	2013
Brazil	64,000	26,000
Kenya	51,336	46,664
Canada	5,036	4,964
Gabon	12,790	15,210
Switzerland	21,017	18,983
Cameroon	22,206	17,794

a) Draw a compound bar graph to show the information given the table above



c) Line and bar graph.

- It is also known as A combined bar and line graph, A temperature – rainfall graph or A rainfall – temperature graph.
- It's used to represent temperature and a rainfall at the same time.

Procedure of drawing:

- Choose a convenient scale for rainfall and the other for temperature.
- In many cases 20mm or 25mm is convenient for rainfall and 5℃ for temperature.
- Temperature curve is plotted above the rainfall bars by a thick zero line (freezing point)
- Incase temperatures drop below 0℃ then above zero line we plot positive values and negative values below the zero line.
- When plotting the temperature curve in this case, it crosses the freezing point to the negative values.
- Bars are drawn for rainfall and a curve for temperature.
- The bars that are drawn to represent rainfall are attached to each other and shaded.

<u>A combined bar and line graph showing the climate statistics of Station X .</u>It must be written on the same page on the graph paper)

- The scale should be stated on the same page with the graph. Scales should be stated as:
  For example
  Vertical Scale: 1 cm represents 25 mm of rainfall
  1 cm represents 5℃ of temperature.
  Horizontal Scale: 1 cm represents 1 month

a) Some calculations on climate statistics.

i. **Mean annual rainfall =** $\frac{Total\ Ranfall\ in\ a\ year}{1\ year}$

ii. **Mean monthly rainfall =** $\frac{Total\ Rianfll\ in\ 12\ months}{12\ months}$

iii. **Mean annual temperature =** $\frac{Total\ temperature\ for\ 12\ months}{12\ months}$

iv. **Annual range of temperature** = Highest temp – Lowest Temp

b) How to describe the characteristics of a climate at a station.

- Carefully study the table and observe the temperature and rainfall rows.
- The area receives a mean annual rainfall of …… mm
- The station experiences a double maxima or two rainfall peaks(Name the months)
- The area receives one rainfall regime or peak in the months of… give the month.
- The station receives heavy rainfall in the month of …….. by ……..
- The total rainfall received at the station is …… mm
- The annual temperature range is ……..
- The mean annual temperature is ……

Identifying the hemisphere:

- This is got by observing the temperature curve and temperature values in the table.

a) Southern hemisphere:

- If the curve is u- shaped (Concave) or facing up. Then the station is in the southern hemisphere.
- Temperatures are high in the beginning of the year, low in the middle of the year and high towards the end of the year.

Reasons given:

- Highest temperature figures between November to March.
- The sun is overhead at the tropic of Capricorn.
- Temperature is high at the beginning and end of the year.

b) Northern hemisphere:

- If the temperature curve is convex (facing down). The station is in the Northern hemisphere.

- Temperatures are high in the middle of the year and low at the beginning and end of the year.

Reasons given:

- The sun is overhead the tropic of cancer in June.
- Temperatures are high in the middle of the year.

d) Divided circles/Pie Charts:

- It should be of a convenient size and not drawing it too small.
- Convert all values given in the table into degrees using the formulae below:

$$\frac{\mathbf{x}}{\mathbf{Total}} \mathbf{X}\, \mathbf{360}^{\circ}$$

- Using a Protractor, draw the segments of individual values in a clockwise direction.
- It's better to begin with the smallest segment/angle to minimize errors.
- Shade the segments for easy interpretation.
- A title, key should be given.

For Pie chart on Relative Importance:

- Values are converted to degrees and percentages.
- The formulae for degrees is already given and the one for percentage is as below:

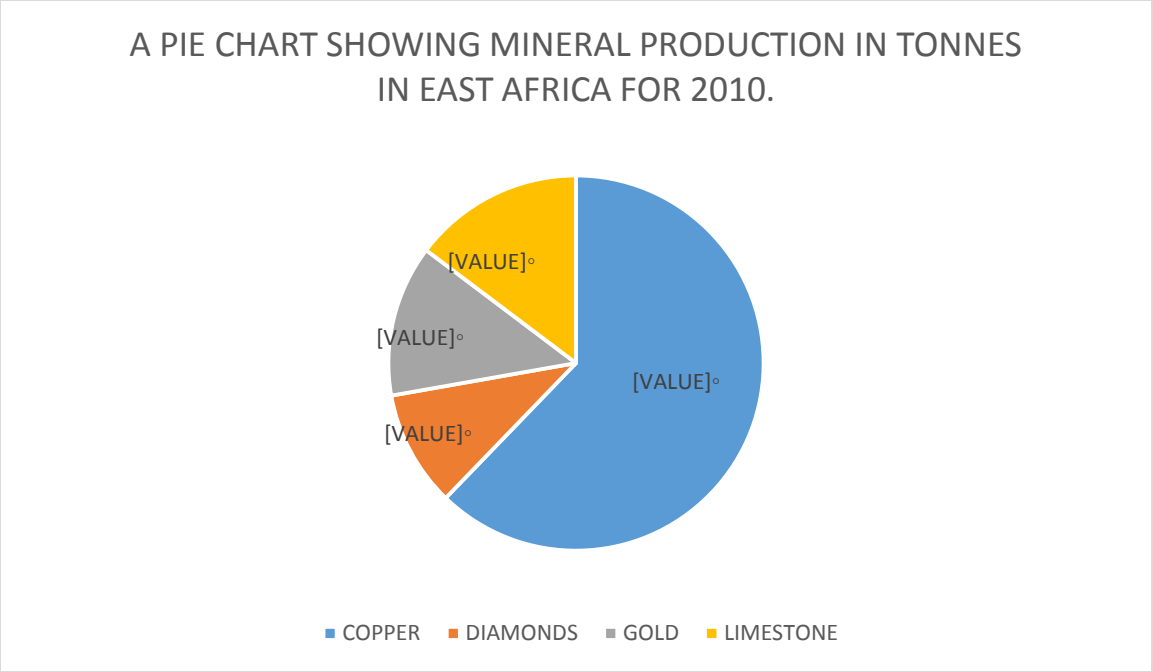
$$\frac{\mathbf{x}}{\mathbf{Total}} \mathbf{X100}\%$$

- Using a protractor the segments are measured in degrees and percentage is written inside that segment.

Study the table below showing mineral production in tonnes in East Africa for 2010 and answer the questions that follow:

Mineral	Mineral production in tonnes
Copper	380
Diamonds	61
Gold	80
Limestone	90
Total	611

a) Draw a pie chart to show the mineral production in 2010.



FORMULAE = $\frac{\mathbf{X}}{\mathbf{TOTAL}}$ **X 360°**

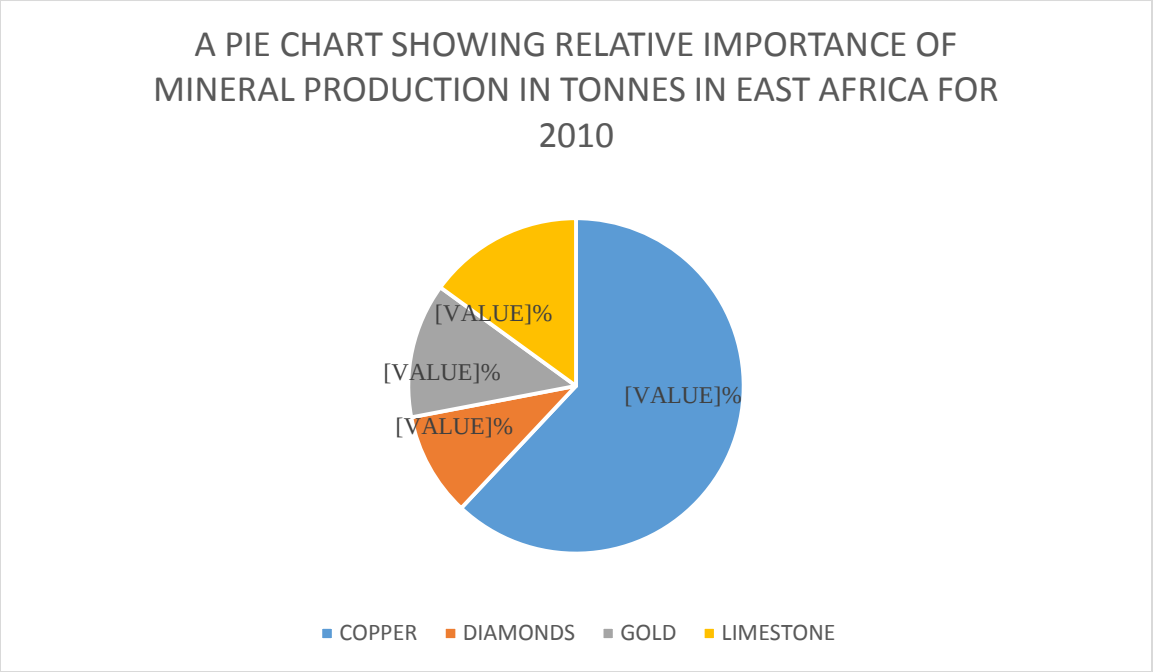
COPPER = $\frac{380}{611}$ X 360° = **224°**

DIAMONDS = $\frac{61}{611}$ X 360° = **036°**

GOLD = $\frac{80}{611}$ X 360° = **047°**

LIMESTONE = $\frac{90}{611}$ X 360° = **053°**

b) Draw a pie chart to show the relative importance of mineral production 2010



FORMULAE = $\frac{\mathbf{X}}{\mathbf{TOTAL}}$ **X 360°**

COPPER = $\frac{380}{611}$ X 360° = **224°**

COPPER = $\frac{380}{611}$ X 100% = **62%**

DIAMONDS = $\frac{61}{611}$ X 360° = **036°**

DIAMONDS = $\frac{61}{611}$ X 100% = **10%**

GOLD = $\frac{80}{611}$ X 360° = **047°**

GOLD = $\frac{80}{611}$ X 100% = **13%**

LIMESTONE = $\frac{90}{611}$ X 360° = **053°**

LIMESTONE = $\frac{90}{611}$ X 100% = **14%**

e) Comparative bar graphs:

- It's also called grouped bar graphs.
- Grouped bars are drawn touching each other but separated from another group.
- All bars should be of the same width.
- Different ways of shading should be used to differentiate the bars.
- A title, scale, key, neatness, labeling are important.

REFERENCES:

01. General Geography in Diagrams by RB. Bunnett.
02. Geography of East Africa for Secondary schools by Abel Nzabona.
03. KCSE Mirror Geography by KB. Kombo.
04. KCSE Revision Geography by Napoloen K. Wasyombwii.

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