GRAPHS

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What is Statistics?

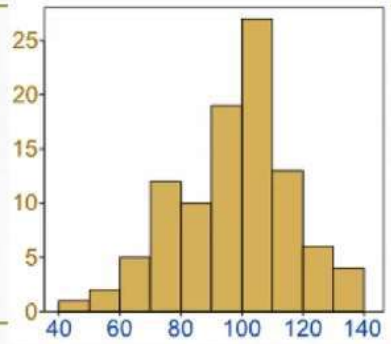
Statistics is the method of conducting a study about a particular topic by collecting, organizing, interpreting, and finally presenting data.

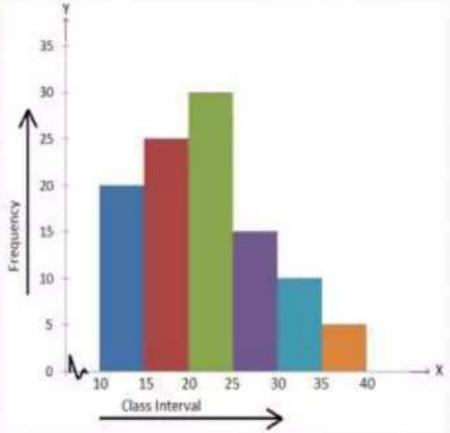
GRAPHS AND IT'S TYPES

- Sometimes significance if figures (i.e. numbers) in tabular presentation is not easily understood. In such cases, health researchers and other executive prefer diagrammatic presentation which is readily understood with the help of graphs, charts or diagrams.
- Graphs of statistical data bring out clear and relative and are helpful in finding out the relationship between two or more sets of data.

- Types of Graphs
  1. Line graph
  2. Bar chart
  3. Pie diagram
  4. Histogram
  5. Frequency polygon

HISTOGRAM





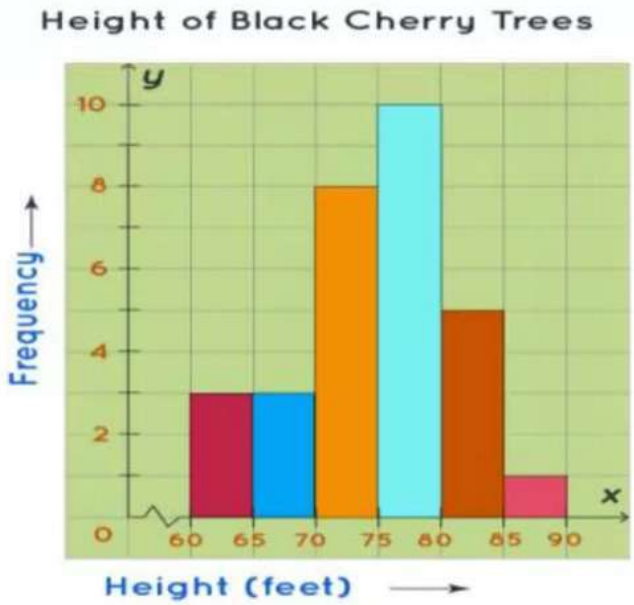
- Histogram is a graphical representation of data where data is grouped into continuous number ranges and each range corresponds to a vertical bar.
- It is the most commonly used diagram to depict grouped frequency distribution graphically.
- The horizontal axis displays the number range
- The vertical axis(frequency) represent the amount of data that is present in each range.

EXAMPLE:-

Uncle Bruno owns a garden with 30 black cherry trees. Each tree is of a different height. The height of the trees (in inches): 61, 63, 64, 66, 68, 69, 71, 71.5, 72, 72.5, 73, 73.5, 74, 74.5, 76, 76.2, 76.5, 77, 77.5, 78, 78.5, 79, 79.2, 80, 81, 82, 83, 84, 85, 87.

61, 63, 64, 66, 68, 69, 71, 71.5, 72, 72.5, 73, 73.5, 74, 74.5, 76, 76.2, 76.5, 77, 77.5, 78, 78.5, 79, 79.2, 80, 81, 82, 83, 84, 85, 87

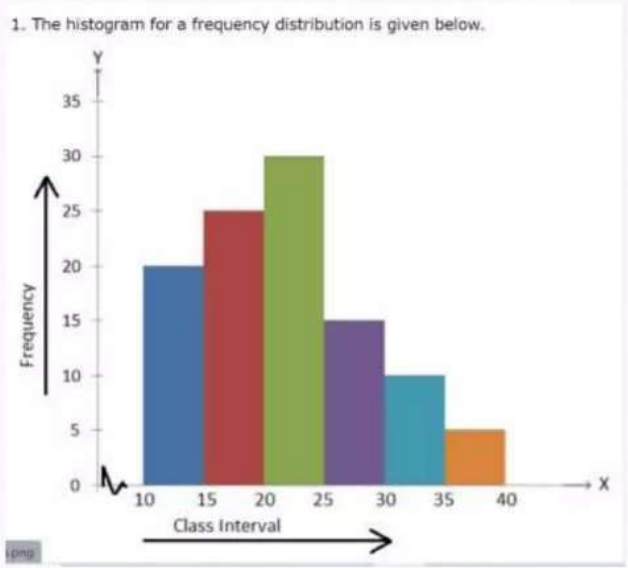
Height (Ft)	60-65	66-70	71-75	76-80	81-85	86-90
No. of Trees(frequency)	3	3	8	10	5	1



The histogram for a frequency distribution given below:-

Answer:-

1. 25
2. 20-25
3. 90



Answer the following.

(1.) What is the frequency of the class interval 15 – 20?

(2.) What is the class intervals having the greatest frequency?

(3.) What is the cumulative frequency of the class interval 25 – 30?

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Works well when the data has a REALLY BIG range
- There is one set of data
- Data collected using a frequency table
- Provides a way to display the frequency of occurrence of data along with interval.
- It assist in decision making
- It summarize large data

DISADVANTAGES

- Use only with continuous data
- More difficult to compare two data sets
- Cannot read exact values because data is grouped into categories.

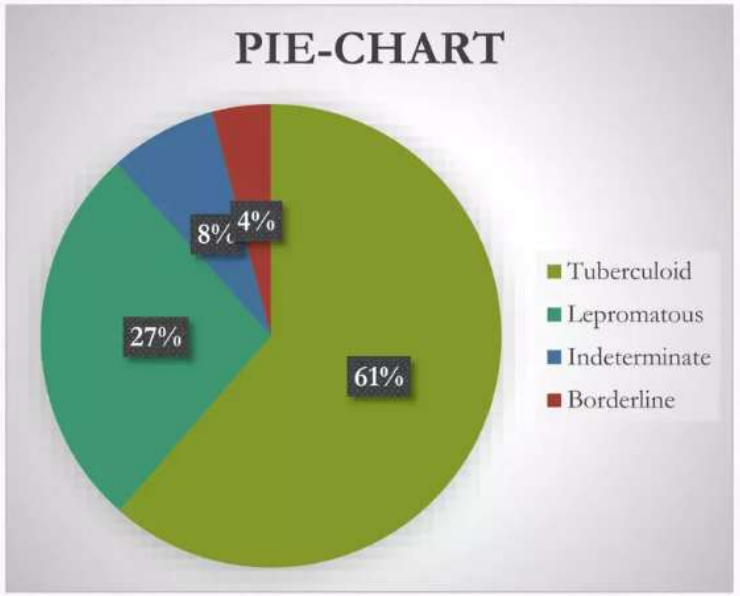
PIE-CHART

- A **pie chart** is a type of graph that represents the data in the circular graph. The slices of pie show the relative size of the data. It is a type of pictorial representation of data. A pie chart requires a list of categorical variables and the numerical variables. Here, the term "pie" represents the whole, and the "slices" represent the parts of the whole.

- The "**pie chart"** is also known as "circle chart", that divides the circular statistical graphic into sectors or slices in order to illustrate the numerical problems. Each sector denotes a proportionate part of the whole. To find out the composition of something, Pie-chart works the best at that time.

EXAMPLE

TYPES OF LEPROSY	No. of patients	Percentages	Degrees
Tuberculoid	148	61.7	32.2
Lepromatous	64	26.7	96
Indeterminate	18	7.5	27
Borderline	10	4.1	15
TOTAL	240	100.0	360



ADVANTAGES AND DISADVANTAGES OF PIE-CHART

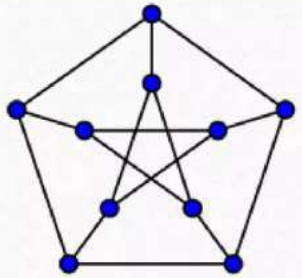
- ADVANTAGES

1. Give audience the best visual for statistics
2. You can under stand with little knowledge of math
3. It can summarize a large set of data with minimal explanation
4. Easier to understand than other graphs and easier to set up.

- DISADVANTAGES

1. A pie chart have only one set of data
2. It is hard to tell which section are bigger
3. You can only use it for expressing data out of a whole
4. There is no numerical data.

CUBIC GRAPH



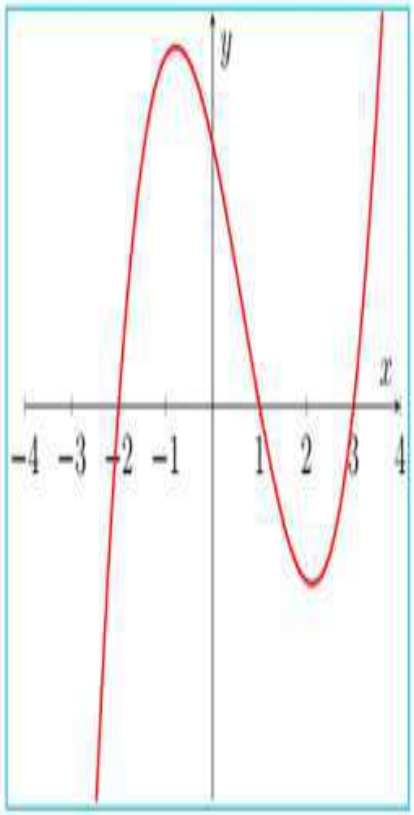
- A cubic graph is a graph in which all vertices have degree three(3D). In other words, a cubic graph is a 3-regular graph.
- Cubic graphs are also called trivalent graphs

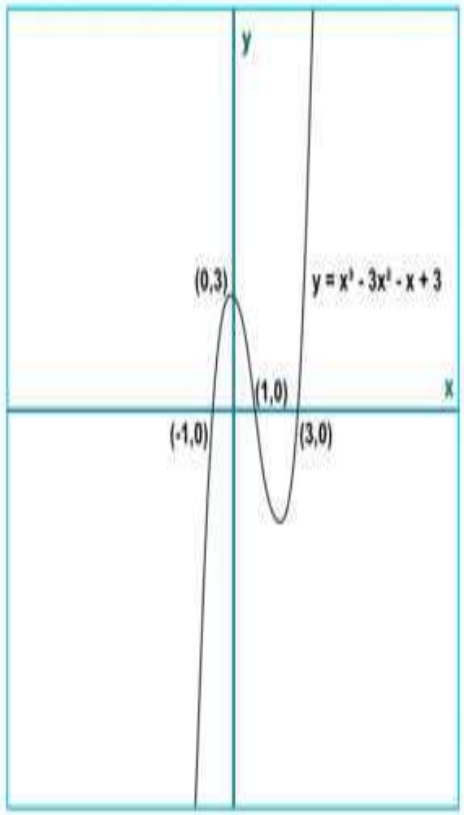
- If the smallest and the largest magnitude to be presented as in the ratio of 1:1000, the bar diagrams cannot be used because of the height of the biggest bar would be 1000 times the height of the smallest bar and thus they would look very disproportionate.

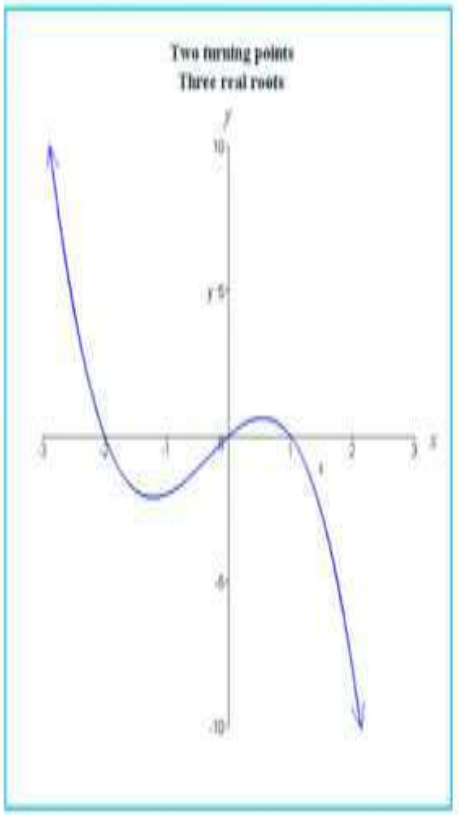
PROPERTIES

- Cubic graphs often have different scales on the x-axis and the y-axis.
- Carefully plotting the coordinates.
- The curve must be smooth- Cubic graphs need to be drawn with a smooth curve.
- Avoid straight line segments.
- Cubic graphs only 2 turning points
  - Make sure that the cubic graph has only one minimum point and one maximum point.
  - Check that the correct values and have plotted them accurately.

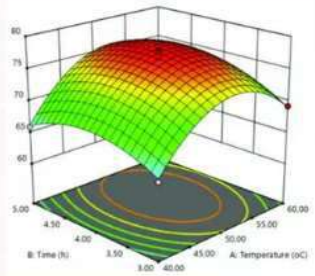
Examples


y
x
−4 −3 −2 −1 1 2 3 4


y
(0,3)
y = x³ - 3x² - x + 3
x
(1,0)
(-1,0)
(3,0)


Two turning points
Three real roots

RESPONSE SURFACE PLOT



Surface plots are diagrams of three-dimensional data. Rather than showing the individual data points, **surface plots** show a functional relationship between a designated dependent variable (Y), and two independent variables (X and Z). The **plot** is a companion **plot** to the contour **plot**.

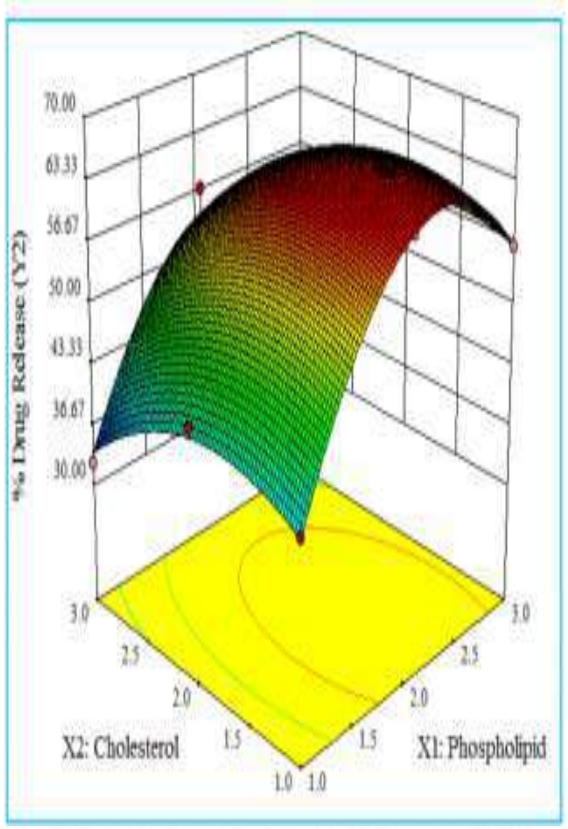
A 2-D grid of X and z is constructed. The range is grid is equal to the range of the data. A 'Y' value is calculated for each grid point. This Y value is a weighted average of all data that is near this grid point.

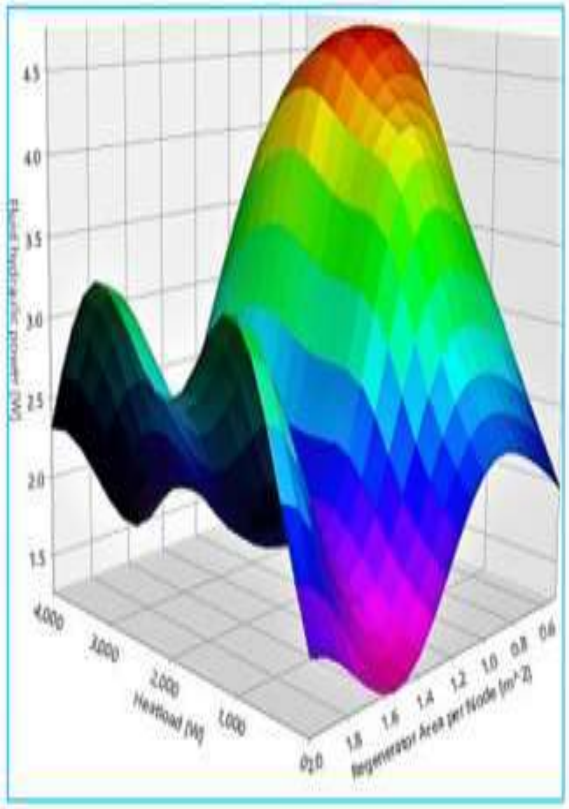
The 3-D surface is constructed using these averages values. Hence, the surface plot does not show the variation at each grid point.

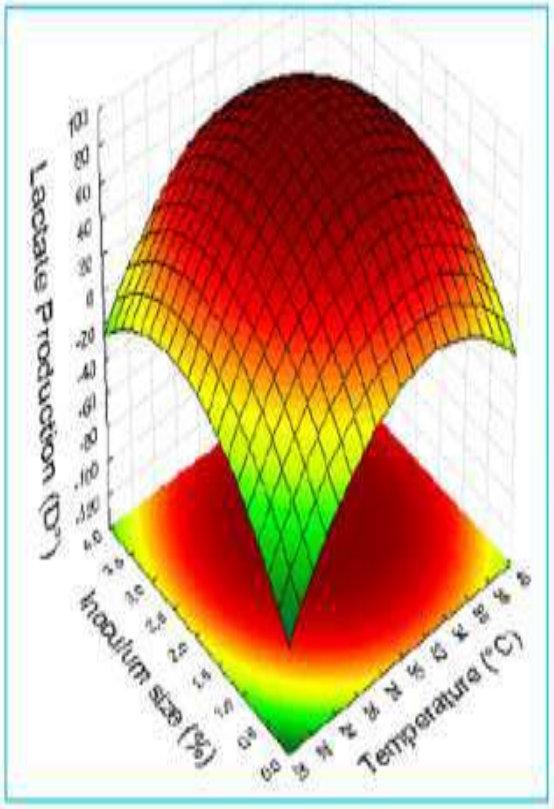
RESPONSE SURFACE PLOT

- Remember that multiple regression assumes that this surface is a perfectly flat surface.

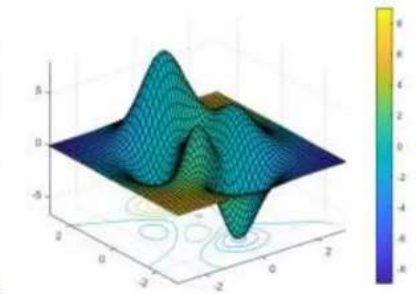
- The 3-D surface is constructed using these averaged values. Hence, the surface plot does not show the variation at each grid point.
- These plots are useful in regression analysis for viewing the relationship among a dependent and two independent variables.


% Drug Release (Y2)
70.00
63.33
56.67
50.00
43.33
36.67
30.00
X2: Cholesterol
X1: Phospholipid
3.0
2.5
2.0
1.5
1.0


4.5
4.0
3.5
3.0
2.5
2.0
1.5
4,000
3,000
2,000
1,000
Heatload (W)


Lactate Production (D')
Inoculum size (%)
Temperature (°C)

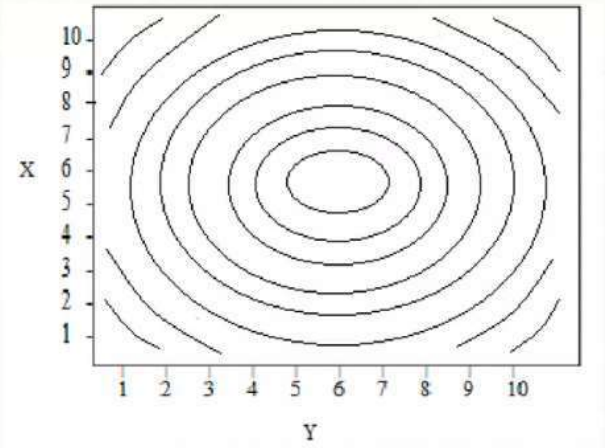
CONTOUR PLOT GRAPH



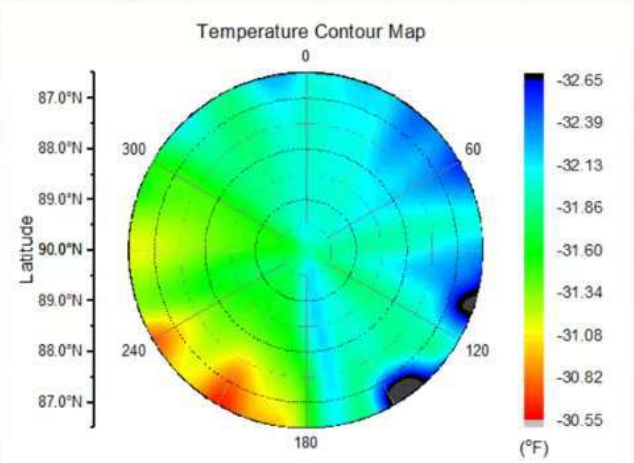
- Contour plots (sometimes called Level Plots) are a way to show a 3-D surface on a 2-D plane. It graph two predictor variables XY on the axis and a response variable Z as contours.
- This type of graph is widely used in cartography, where contour lines of topological map indicate elevation that are the same.
- Many others disciplines use contour graph including astrology, meteorology and physics.
- Contour lines commonly shows altitude height of geographical area.
- Also be used to show density, brightness, or electric potential.

TYPES OF CONTOUR PLOT

1. RECTANGUALR CONTOUR PLOT

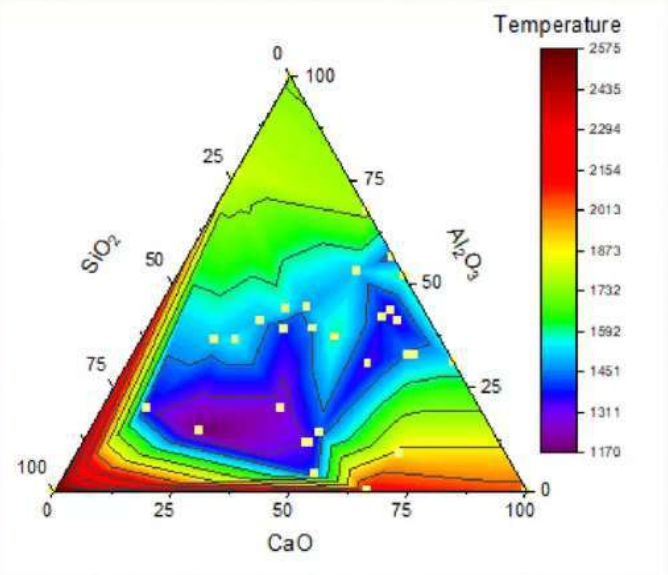


2. POLAR CONTOUR PLOTS



TYPES

- **Ternary plots** are triangular and show a relationship between three explanatory variables and a response variable. Most commonly, the third explanatory variable is a height value for an XYZ value in ternary space.



THE END

THANK YOU