

Statistical Reasoning

Bivariate Data

Scatterplots and Regression

Name: _____

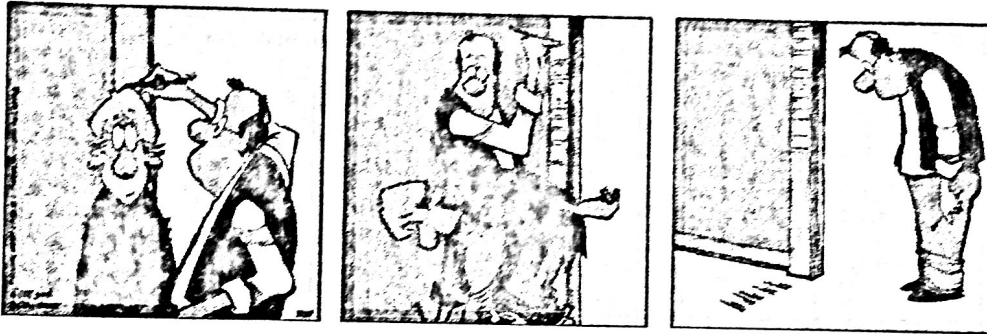
Date: _____

Class: _____

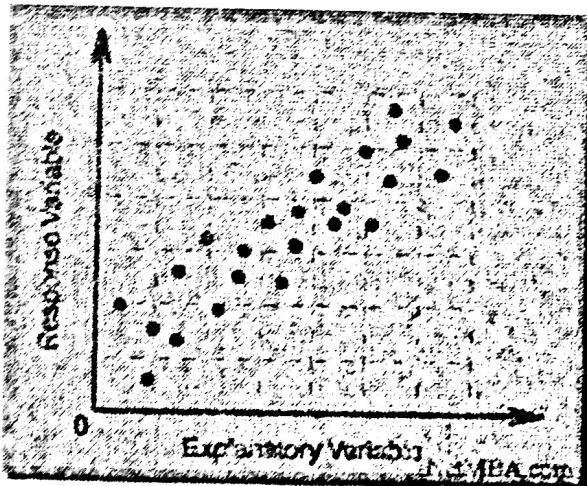
Two Categorical/Quantitative Variables

Bivariate data indicates a relationship between two numerical variables.

In many cases, changes in a variable x are thought to "explain" or even cause changes in a second variable y . In such examples, x is called the explanatory (or independent) variable and y is called the response (or dependent) variable.



A scatterplot is a plot of observations of numerical data, x and y as points in the coordinate plane. The explanatory variable is always plotted on the horizontal (x -axis) of the scatterplot. (If no explanatory variable, either can be horizontal/vertical.) The response variable is always plotted on the vertical (y -axis) of the scatterplot.



Types of scatterplots

> Stimulus/Response

if control the stimulus—get a clear explanatory/response relationship.

> observational

less clear causal relationship

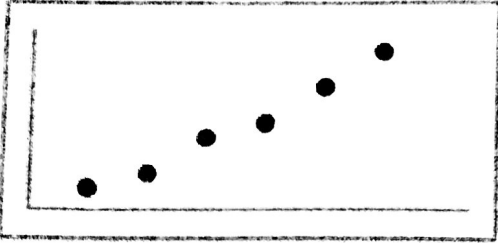
> Time plot

scatterplot with time as explanatory variable; shows "change over time"

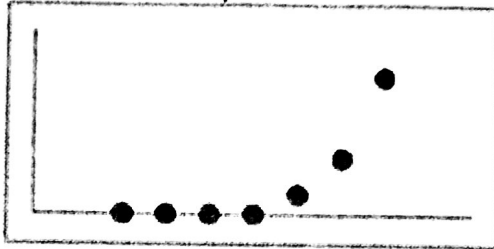
- for bivariate data (scatterplots), look for overall patterns or shapes (linear, curved, random scatter), direction, and strength of the relationship
- look out for extreme data or deviations (outliers, clusters, gaps)

SHAPE

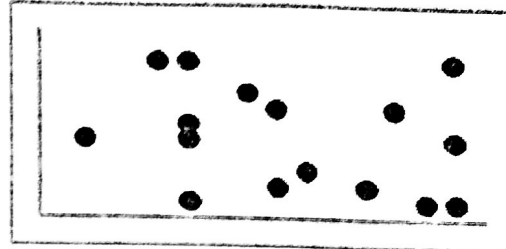
Linear



Curved

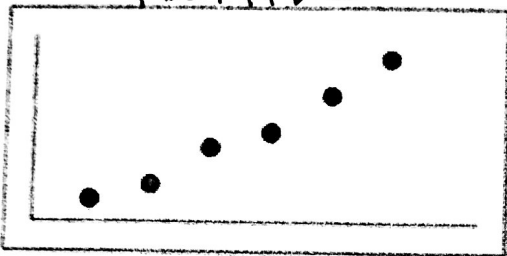


None



DIRECTION

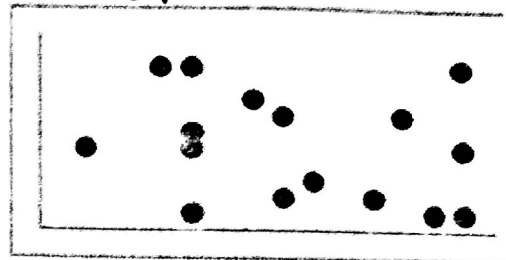
Positive



Negative

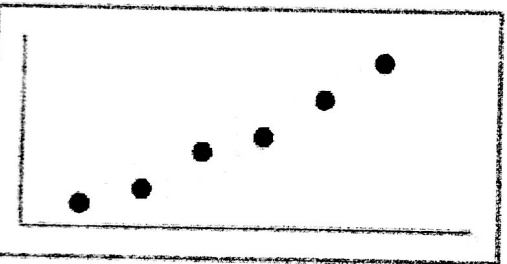


None

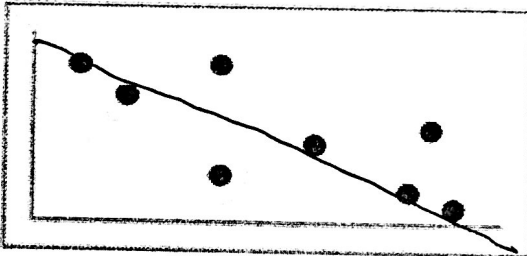


STRENGTH

Strong



Moderate



Weak / No

