

Unit - 5

Time Series & forecasting

• Components of Time series

- 1) Secular Trends or Trends (T)
- 2) Seasonal Variations (S)
- 3) Cyclic Variations (C)
- 4) Irregular Variations (I)

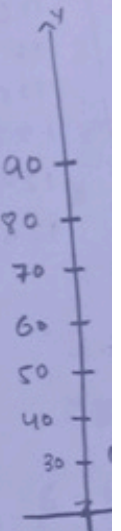
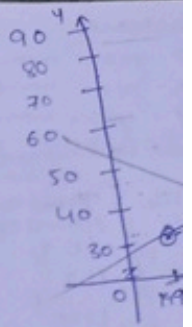
① Secular Trends or Trends (T)

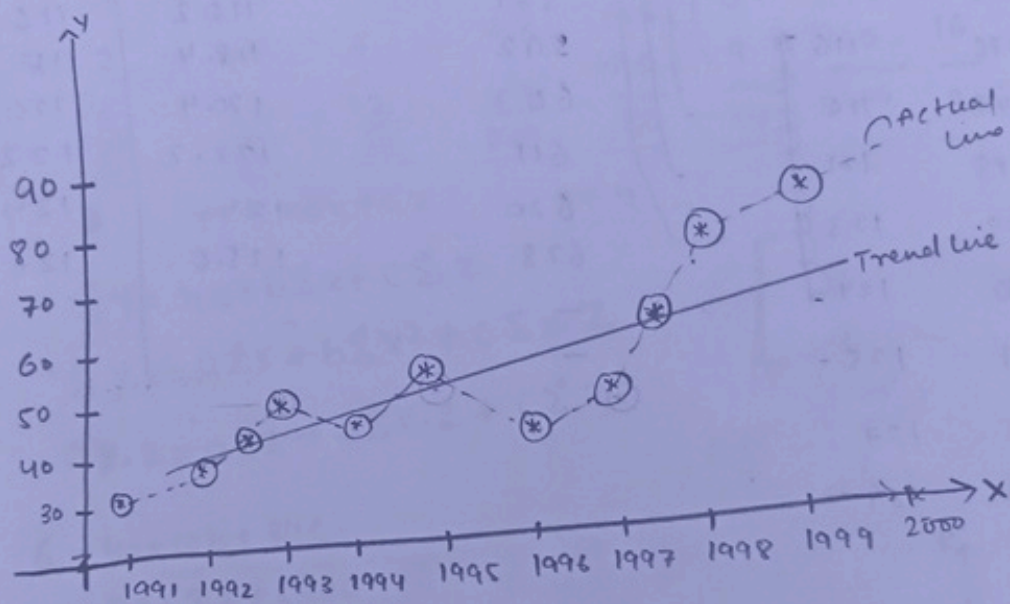
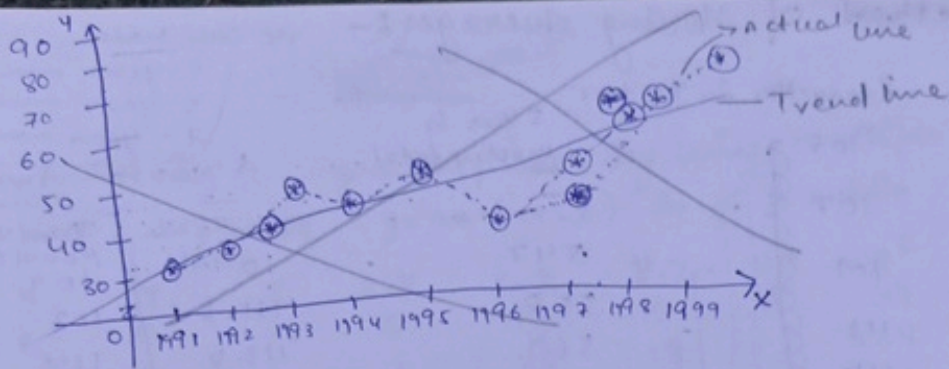
- Ⓐ Graphical method Ⓑ Method of least square
 Ⓒ Method of Semi Averages Ⓓ Method of moving Averages.

→ Method of Semi Averages

Years	Sales	Semi Averages
1991	32	$\frac{32+38+50+48}{4} = 42$
1992	38	
1993	50	
1994	48	
1995	54	$\frac{42+48+72+82}{4} = 61$
1996	42	
1997	48	
1998	72	
1999	82	

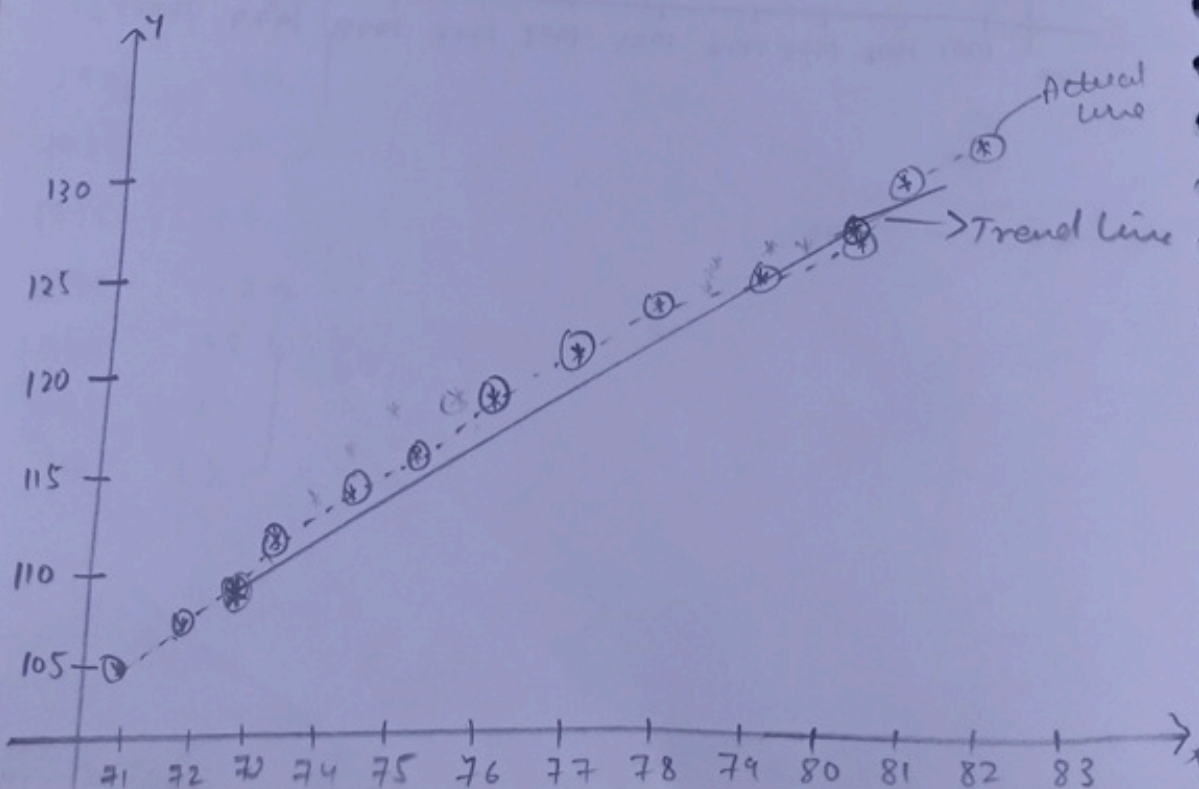
$\left\lfloor \frac{n}{2} \right\rfloor$ — floor value
 $\frac{n}{2} = \frac{9}{2} = 4.5$
 $\left\lfloor 4.5 \right\rfloor = 4$
 $\left\lceil \frac{n}{2} \right\rceil$ — ceiling value
 $\left\lceil 4.5 \right\rceil = 5$





Method of Moving Averages:-

Years	Production in '000 tons	5 year by moving total	5 year by moving average	Trend values Round off
1971	105			
1972	107			
1973	109	547	109.4	109
1974	112	558	111.6	112
1975	114	569	113.8	114
1976	116	581	116.2	116
1977	118	592	118.4	118
1978	121	602	120.4	120
1979	123	611	122.2	122
1980	124	620	124	124
1981	125	628	125.6	126
1982	127			
1983	129			



① Seasonal Variations:-

- The components responsible for the regular rise and fall in the magnitude of the time series is called Seasonal Variation.
- These variations repeat themselves in less than one year.
- Seasonal variations occurs due to natural forces and social customs and traditions.

The Purpose of Studying Seasonal Variations is

- (i) To isolate the effect of seasonal factors.
- (ii) To eliminate these effects from the time series.

② Cyclic Variations:-

- Cyclical Variations is the component of a time series that tends to oscillate above and below the secular trend line for period longer than one year.
- These variations occur due to up's & downs recurring after a period greater than one year.

③ Irregular Variations:-

Irregular Variations do not exhibit any definite pattern. There is no regular period or time of their occurrence. These are accidental changes which are purely random in force & unpredictable.

eg.
Earthquake, flood, Covid etc.