

Time Series consist of four components -

Pg 01

→ Seasonal variation

Secular Trends

Seasonal Variations

Cyclical Variations

Irrregular Variations

Methods of Measuring Trends -

- free hand curve method
- Semi Average method
- Moving Average method
- least square method

Ques - find a trend line to the following data by the free hand curve method.

Year	Production
1971	150
1972	155
1973	165
1974	152
1975	174
1976	180
1977	174
1978	178
1979	160

1980-1980

## 2.) Semi Average Method -

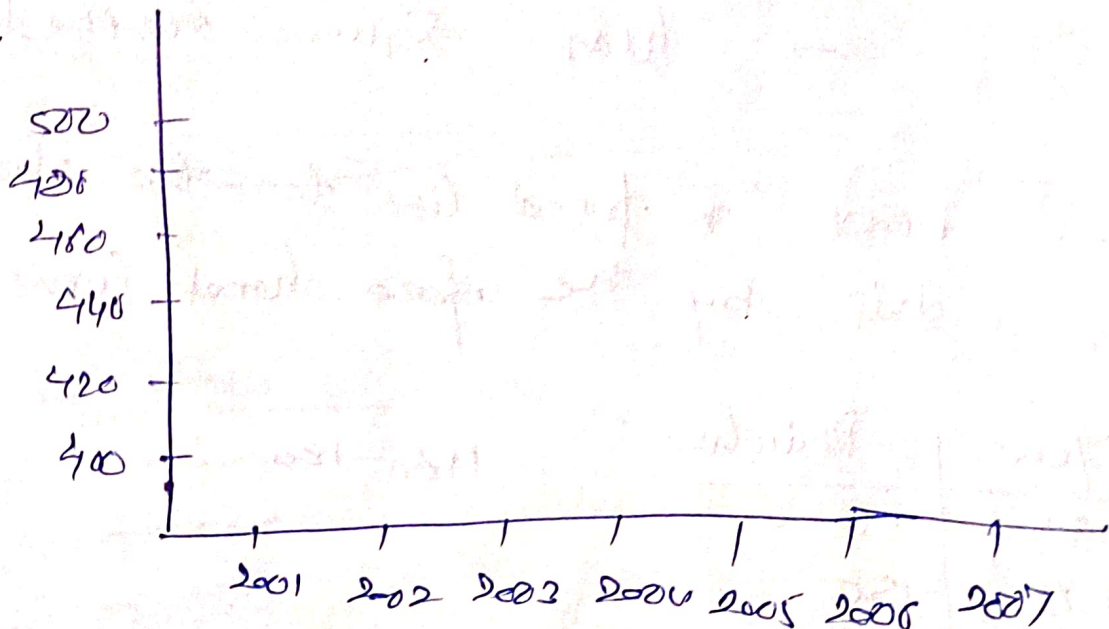
P2-02

Question → Find a trend line by the method of semi average to the data given

Years	Sales (Units)	Semi Total	Semi Average
2000	412	1748	$1748 \div 4 = 437$ - 2001.5
2001	438		
2002	446		
2003	454		
2004	470	1942	$1942 \div 4 = 485.5$ - 2005.5
2005	482		
2006	490		
2007	500		
2008			

Exer →

Graph -





Q11. - find a trend line by method of Boz semi average

Years	Profit (Lakhs)	Semi Total	Semi Avg	
1981	20	69	$69 \div 3 = 23$	1982
1982	22			
1983	27			
1984	26			
1985	30	99	$99 \div 3 = 33$	1986
1986	29			
1987	40			

## Moving Average →

Ques 12 - from the given data calculate 3 years, 5 yearly moving average

Year	Cyclical fluctuation	3 years moving sum	3 years moving aver	Year	+1	+1	Moving Avg
1989	+2	3	3.33	2000	+1	+1	
1990	+1			2001	0	+2	
1991	0			2002	-2	-1	
1992	-2	-1		2003	-1	-1	
1993	-1						
1994	+2						
1995	+1	2					
1996	0						
1997	-2						
1998	-1	-3					
1999	+1						

Ques - Calculate trend value using 4 yearly moving average Pg no - 41

Year	Sales	4 years moving total	2 Period moving total of 4 years moving total	4 year moving average
1970	7			
1971	8			
1972	9	$7+8+9+10 = 35$	$(35+38) \div 2$	
1973	11	$8+9+11+10 = 38$	$38+42 \div 2$	
1974	10	$9+11+10+12 = 42$	$42+31 \div 2$	
1975	12	$11+10+12+8 = 41$	$31+41 \div 2$	
1976	8	$10+12+8+6 = 36$	$41+36 \div 2$	
1977	6	$12+8+6+10 = 36$	$36+31 \div 2$	
1978	5	$8+6+5+10 = 29$	$31+29 \div 2$	
1979	10			

Year	Sales
2019	120
2020	130
2021	180
2022	160
2023	185
2024	190