



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MOVING AVERAGE

Example

1. The table below gives details of the electricity generated in million kilowatt hours in each quarter for the years 2002 to 2004.

Year	Quarter			
	1st	2nd	3rd	4th
2002	8	7	6	9
2003	10	7	7	10
2004	11	7	8	10

Calculate the 4-quarterly moving average and show these moving average on a graph.



[View Text Solution](#)

2. Coded monthly sales figures of a particular brand of T.V. for 18 months commencing January 1, 2005 are as follows:

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2005	18	16	23	27	28	19	31	29	35	27	28	24
2006	24	28	29	30	29	22						

Calculate 6-monthly moving averages and

display these and the original figures on the same graph using the same axes for both.



[View Text Solution](#)

Exercise 31

1. This table shows the number of students in a school getting at least a grade C in mathematics for the years 1994 to 2001.

(i) Represent this data as a time series.

1994	1995	1996	1997	1998	1999	2000	2001
97	118	115	117	121	125	111	125



[View Text Solution](#)

2. The profits of a soft drink firm in thousand of litres during each month of a year were:

January	February	March	April	May	June
1.2	0.8	1.4	1.6	2.0	2.0
July	August	September	October	November	December
3.6	4.8	3.4	1.8	0.7	1.2

Calculate 3-monthly moving averages and illustrate graphically.



[View Text Solution](#)

3. The number of traffic offences committed in a certain city over a period of 3 years is given in the following table:

	<i>Jan.–March</i>	<i>April–June</i>	<i>July–Sept.</i>	<i>Oct.–Dec.</i>
1968	74	56	48	69
1969	83	52	49	81
1970	94	60	48	79

Calculate 4-quarterly moving averages and illustrate these and original figures on one graph using the same axis for both. Comment briefly on a local politician's claim that traffic offences were on the increase.



[View Text Solution](#)

4. Find the 4-quarterly moving averages in the following table which gives the quarterly index numbers of coal production (for the years 1936 - 1938). Also plot on the same graph the quarterly index numbers as well as the 4-quarterly moving average. Comment on the nature of the general trend.

Year	<i>Quarters</i>			
	1	2	3	4
1936	93.3	81.7	81.5	89.1
1937	93.8	92.3	86.5	93.7
1938	97.6	82.3	79.0	89.3



View Text Solution

5. The annual incomes of a firm were recorded every quarter for 4 years. The results are shown in this table.

	1999	2000	2001	2002
1st quarter	₹ 18,00,000	₹ 20,00,000	₹ 21,00,000	₹ 22,50,000
2nd quarter	₹ 14,50,000	₹ 17,80,000	₹ 19,50,000	₹ 21,00,000
3rd quarter	₹ 13,50,000	₹ 15,00,000	₹ 18,00,000	₹ 19,80,000
4th quarter	₹ 19,00,000	₹ 18,30,000	₹ 19,20,000	₹ 20,50,000

(i) Work out the 4-point moving average for the data.



[View Text Solution](#)

6. The annual incomes of a firm were recorded every quarter for 4 years. The results are

shown in this table.

	1999	2000	2001	2002
1st quarter	₹ 18,00,000	₹ 20,00,000	₹ 21,00,000	₹ 22,50,000
2nd quarter	₹ 14,50,000	₹ 17,80,000	₹ 19,50,000	₹ 21,00,000
3rd quarter	₹ 13,50,000	₹ 15,00,000	₹ 18,00,000	₹ 19,80,000
4th quarter	₹ 19,00,000	₹ 18,30,000	₹ 19,20,000	₹ 20,50,000

(iii) Comment on how the firm's incomes have changed over the 4-years.



[View Text Solution](#)

7. The following table shows the daily sales of milk at a local corner shop for a month.

<i>Sun</i>	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>	<i>Sat</i>
12	8	6	9	4	11	15
11	7	7	6	3	15	14
14	9	7	7	5	12	15
11	12	8	7	4	14	19

Make a table showing the moving average using a 7-day span, and draw a graph to show the trend of milk sales over the month.



[View Text Solution](#)

8. The following table gives the monthly expenditure on a motor car for a period of two years.

<i>Year</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>May</i>	<i>June</i>
1961	£ 18.2	7.4	9.4	10.6	11.3	9.2
1962	£ 11.5	11.0	6.9	14.1	9.0	8.3
<i>Year</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
1961	£ 9.8	10.6	8.2	7.7	19.2	8.7
1962	£ 13.9	7.9	7.5	16.5	8.2	10.7

Calculate 12-monthly moving averages for the

two years and display them and the original table on the same graph.



[View Text Solution](#)

9. A new film was shown at a theatre and ran for six weeks. The attendances are shown in the table.

	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>	<i>Sat</i>
First week	243	268	407	384	348	489
Second week	445	501	623	621	527	684
Third week	602	625	800	763	728	800
Fourth week	800	800	800	800	800	800
Fifth week	721	785	800	800	800	800
Sixth week	647	664	683	642	608	726

(ii) Calculate the 6-day moving average for the Data and plot this on the same graph.



[View Text Solution](#)

10. A new film was shown at a theatre and ran for six weeks. The attendances are shown in the table.

	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>	<i>Sat</i>
First week	243	268	407	384	348	489
Second week	445	501	623	621	527	684
Third week	602	625	800	763	728	800
Fourth week	800	800	800	800	800	800
Fifth week	721	785	800	800	800	800
Sixth week	647	664	683	642	608	726

(iii) Comment on the weekly attendances.



[View Text Solution](#)

11. The table below given details of the electricity generated in million kilowatt hours for public supply in each quarter of the years 1952 to 1955.

Year	Quarter			
	1	2	3	4
1952	8.9	7.1	6.7	9.3
1953	10.1	7.5	7.1	10.5
1954	11.7	7.5	8.3	10.9
1955	12.5	8.3	9.5	11.7

Draw a graph illustrating these figures.

Calculating a set of moving averages using the most suitable number of observations, give reasons of your choice. On the same diagram as before draw a graph showing the moving averages.



[View Text Solution](#)

12. The number of letters, in hundreds, posted in a certain city on each day of a fortnight was as follows:

	<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>
First Week	35	70	36	59	62	60	71
Second Week	39	72	38	56	63	71	75

Calculate the 7-day moving averages and display these and the original figures graphically on the same diagram, using the same scale and axes.

What is the general trend?



[View Text Solution](#)

13. In an influenza epidemic the numbers of cases diagnosed were:

Date (March)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Numbers	2	0	5	12	20	27	46	30	31	18	11	5	0	1

On what days do the mode and upper and lower quartiles occurs?

Calculate 3-day moving averages and display them and the original figures on the same graph.



[View Text Solution](#)

	<i>Date rate per thousand</i>			
	<i>Quarter ended</i>			
<i>Year</i>	<i>March</i>	<i>June</i>	<i>September</i>	<i>December</i>
1953	13.9	10.3	8.1	10.6
1954	13.8	9.8	7.8	10.8
1955	14.2	10.1	7.8	10.0

14.

Plot these figures on a graph.

Calculate the 4-quarterly moving averages and plot on the same graph.



[View Text Solution](#)

15. Registered unemployed (hundreds)

	1957	1958
January	638	596
February	602	548
March	509	491
April	462	462
May	359	365
June	295	325
July	290	308
August	322	328
September	377	377
October	392	380
November	480	474
December	542	536
Average for year	439	432.5

Plot these monthly figures on a graph.

Calculate the 12-monthly moving averages and

plot these on the same graph.



[View Text Solution](#)

16. A Ballet Company gave a 6-week's season at a large hall capable of seating 4000 people and the attendances in hundreds, at the evening performances, are recorded in the following table.

Attendance, in hundreds, to nearest hundred

	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>
First week	12	13	20	19	17	24
Second week	22	25	31	31	26	34
Third week	30	31	40	38	36	40
Fourth week	40	40	40	40	40	40
Fifth week	38	39	40	40	40	40
Sixth week	32	33	34	32	30	36

Plot a graph of the above time-series and include on the same diagram the graph of 6-day moving averages.

Comment on the weekly cycle on attendances and state, with reasons, if you think, an

extension of the season of the eight weeks, would have been justified.



[View Text Solution](#)

17. Production of passenger cars, U.S.A. (tens of thousands)

Year	Quarters			
	I	II	III	IV
1927	26	36	24	11
1928	29	36	36	22
1929	40	52	43	17

Calculate the 4-quarterly moving averages and then draw the graphs of the given series and

the moving averages. Briefly comment on the general trend.



[View Text Solution](#)

18. The aggregate number, in millions, of working days lost in strikes during each year of the period 1950-60 was

1950	'51	'52	'53	'54	'55	'56	'57	'58	'59	'60
1.4	1.7	1.8	2.2	2.5	3.8	2.1	8.4	3.5	5.3	3.0

Draw a graph to represent this formation.

Calculate the 3-yearly moving averages and

draw the 3-yearly moving averages graph,

using the same axes and scales. What is the main purpose in drawing moving average graph? Comment on whether the purpose is achieved in this case.



[View Text Solution](#)

19. The profits of a soft drink firm in thousands of rupees during each month of a year were:

<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>
1.2	0.8	1.4	1.6	2.0	2.4	3.6	4.8	3.4	1.8	0.8	1.2

Plot these on a graph

Calculate 4-monthly moving averages and plot

these on the same graph. Comment on the general trend.



[View Text Solution](#)

20. Calculate 5-yearly moving averages for the following data of the commercial and industrial failures in a country from 1982 to 1997.

<i>Year</i>	<i>No. of failures</i>	<i>Year</i>	<i>No. of failures</i>
1982	23	1990	9
1983	26	1991	13
1984	28	1992	11
1985	32	1993	14
1988	12	1996	3
1989	10	1997	1

Display the actual and trend values on the same graph using the same axes for both.



[View Text Solution](#)

21. The table given below shows the daily attendance in thousands as a certain exhibition over a period of two weeks:

Week 1	52	48	64	68	52	70	72
Week 2	55	47	61	65	58	75	81

Calculate 7-day moving averages and illustrate these and original information on the same graph using the same scales.



[View Text Solution](#)

22. The profit of a soft-drink firm (in thousands of rupees) during each month of the year is as given below:

<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Déc.</i>
3.6	4.3	4.3	3.4	4.4	5.4	3.4	2.4	3.4	1.8	0.8	1.2

Calculate the 4-monthly moving averages and plot these and the original data on a graph sheet.



[View Text Solution](#)

Chapter Test

1. The following table gives the numbers of failures of commercial industries in a country during the years 1975 to 1990.

Year	1975	1976	1977	1978	1979	
No. of failures	23	26	28	32	20	
Year	1980	1981	1982	1983	1984	
No. of failures	12	12	10	9	13	
Year	1985	1986	1987	1988	1989	1990
No. of failures	11	14	12	9	3	1

Draw the graph illustrating the figures.

calculate the 4-yearly moving average and plot them on the same graph.



[View Text Solution](#)

2. The average number, in lakhs, of working days lost in strikes during each year of the period 1981-90 was

1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1.5	1.8	1.9	2.2	2.6	2.7	2.2	6.4	3.6	5.4

Calculate the 3-yearly moving average and draw the moving average graph.



[View Text Solution](#)

3. The profit of a soft drink firm (in thousand of rupees) during each month of the year is as

given below:

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Profits (in thousands of rupees)	3.6	4.3	4.3	3.4	4.4	5.4	3.4	2.4	3.4	1.8	0.8	1.2

Calculate the 4-monthly moving averages and plot these and the original data on a graph sheet.



[View Text Solution](#)

4. The quarterly profits of a small scale industry (in thousand of rupees) is as follows:

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2012	39	47	20	56
2013	68	59	66	72
2014	88	60	60	67

Calculate 4-quarterly moving average. Display these and the original figures graphically on the same graph sheet.



[View Text Solution](#)

5. The number of road accidents in the city due to rash driving over a period of 3-years, is given in the following table:

Year	Jan. – Mar.	April – June	July – Sept.	Oct. – Dec.
2010	70	60	45	72
2011	79	56	46	84
2012	90	64	45	82

Calculate four quarterly moving averages and

illustrate them and original figures on one graph using the same axes for both.



[View Text Solution](#)