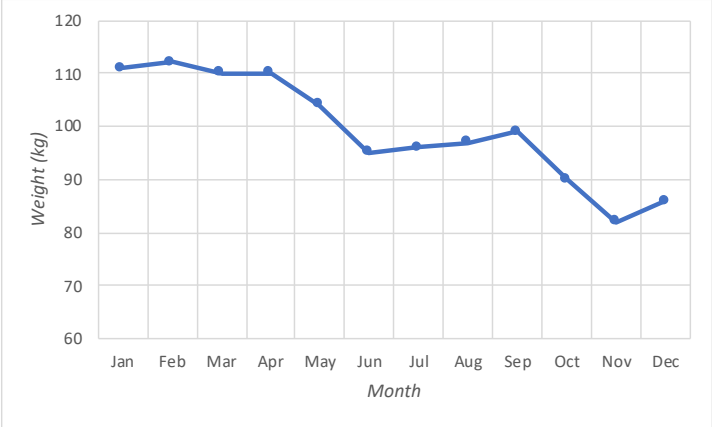
Chapter 5 Time Series Analysis: **Assignment**

Student name: _____

1 Construct a time series plot to display the following data:

Year	2015	2016	2017	2018	2019	2020	2021	2022
Sales	24	28	30	34	32	38	37	42

2 Bill decides to join a gym. The following plot shows his weight in kilograms over a one-year period of gym membership.



Describe the features of the plot.

3

a The following table shows the number of phone calls Phoebe receives each day over a one-week period:

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Number of calls	10	11	16	26	27	22	26

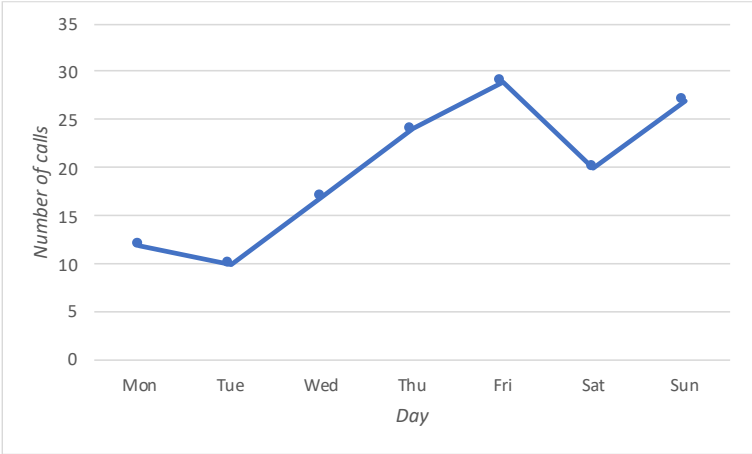
i Determine the three mean smoothed value for Friday.

ii Determine the five mean smoothed value for Thursday.

b The following graph shows the number of phone calls Phoebe receives each day over a different one-week period:

© Jones, Lipson, Evans, Humberstone, Karakoussis, Staggard 2023

Chapter 5 Time Series Analysis: **Assignment**



Mark on the graph:

i The three median smoothed value for Tuesday.

ii The five median smoothed value for Thursday.

4 A company has determined the seasonal indices for a range of different variables, and these are given in the following tables. Find the value of the missing seasonal index in each table.

a

Sales of Swimsuits	Summer	Autumn	Winter	Spring
Seasonal index	1.10	1.05	0.65	

b

Job applications	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Seasonal Index	1.1		1.2	1.0	0.95	0.95	0.8	0.7	0.85	0.85	1.1	1.1

5 The value of 1 Bitcoin in Australian dollars (exchange rate) over a 7-day period is given in the table.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Exchange rate ($)	15819	16945	16990	16991	17092	17104	17310

a Determine the centred two mean smoothed value for Wednesday.

b Determine the centred four mean smoothed value for Wednesday.

© Jones, Lipson, Evans, Humberstone, Karakoussis, Staggard 2023

6 A hairdresser records the number of clients attending her salon each month over a two-year period, with the following results:

Clients	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 1	112	118	132	129	121	135	148	148	136	119	104	118
Year 2	115	126	141	135	125	149	170	170	158	133	114	140

a Use the data to determine seasonal indices for each of the 12 months, giving the value rounded to two decimal places.

b Use the seasonal indices to construct a table of the deseasonalised data, giving the data values rounded to one decimal place.

c Construct a time series plot showing both the actual data and the seasonalised data on the same axes and describe each plot separately.

d Determine the equation of the least square regression line relating the number of clients to month for the deseasonalised data, giving the values of the coeffients rounded to two decimal places.

e Interpret the intercept and slope of the least squares regression equation.

f Use the least squares equation, and the seasonal indices, to predict the actual number of clients the hairdresser will see in December of Year 3, giving the value rounded to the nearest whole number.

© Jones, Lipson, Evans, Humberstone, Karakoussis, Staggard 2023