

Question 15**(15 marks)**

- (a) The table below shows some time series data where t represents time.

t	1	2	3	4	5	6	7	8
x	14	17	18	24	21	19	16	13

Calculate at $t = 4$

- (i) the 3-point moving average. (1 mark)

- (ii) the 6-point centred moving average. (2 marks)

- (b) A retailer in a shopping centre sells mobile phones. The data of its quarterly sales, together with some calculations, are shown in the table below.

Year	Data number (<i>n</i>)	Quarter	Mobile phone sales	Quarterly mean	Percentage of quarterly mean	Deseasonalised figure (<i>D</i>)
2013	1	March	901	905	99.56	915
	2	June	802		88.62	914
	3	September	<i>A</i>		97.68	900
	4	December	1033		114.14	894
2014	5	March	973	984.5	98.83	988
	6	June	863		<i>C</i>	984
	7	September	964		97.92	981
	8	December	1138		115.59	985
2015	9	March	1049	1065.5	98.45	1065
	10	June	932		87.47	<i>E</i>
	11	September	1049		98.45	1068
	12	December	1232		115.63	1066
2016	13	March	1119	<i>B</i>	97.01	1136
	14	June	1006		87.21	1147
	15	September	1142		99.00	1162
	16	December	1347		116.78	1166

- (i) Determine the value of A , B and C in the table in part (b) on the previous page. (3 marks)

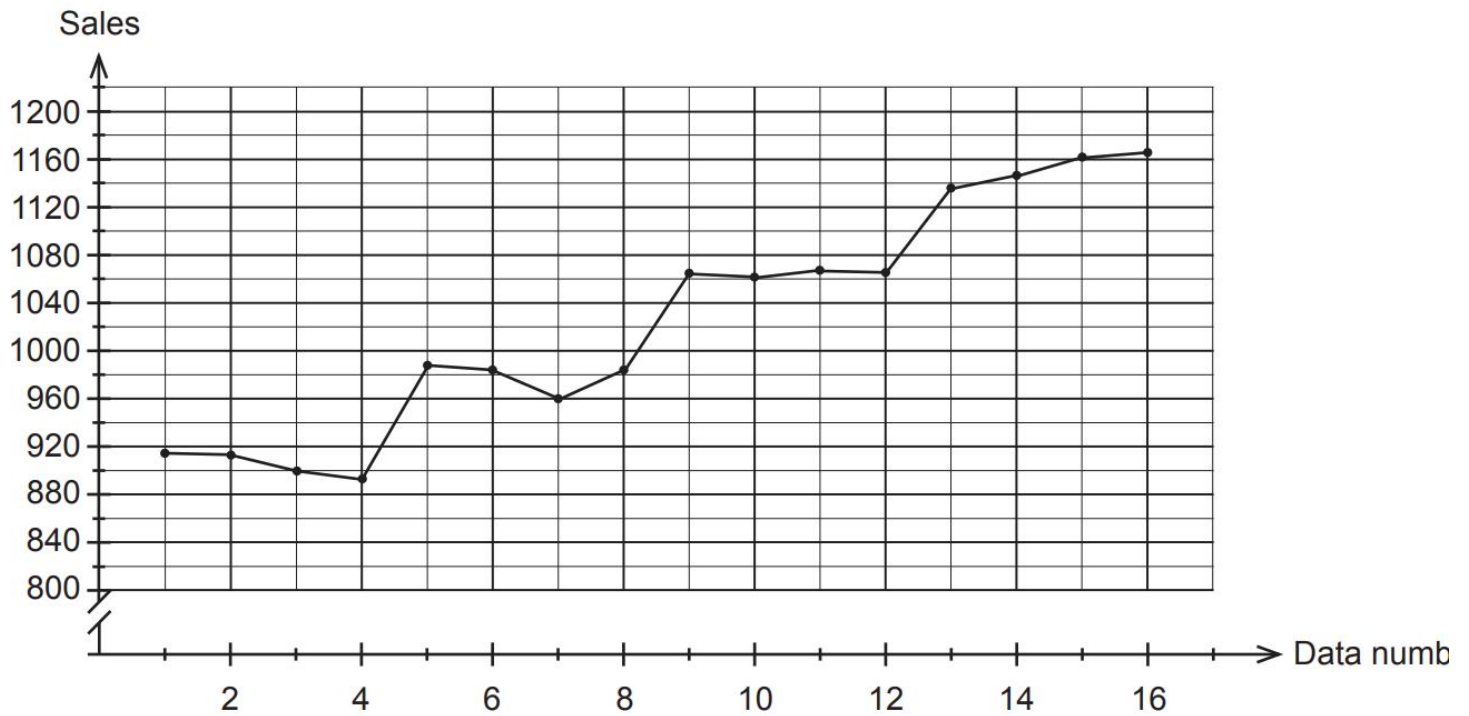
- (ii) Complete the Seasonal Index table below. (1 mark)

Quarter	March	June	September	December
Seasonal Index	0.9846	0.8774	0.9826	

- (iii) Determine the value of E in the table in part (b) on the previous page. (2 marks)

The equation of the least-squares line for deseasonalised figure against data number is $D = 19.37n + 862.4$.

- (iv) The graph below shows the deseasonalised figures. Draw, on the graph, the least-squares line. (2 marks)



- (v) Predict the mobile phone sales for December 2017. (2 marks)

- (vi) Comment on the reliability of your prediction made in part (v). (2 marks)