4.8 Time Series: 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The table shows quarterly figures for the daily number of hot drinks sold at a kiosk.

Quarter	Value
2021 Q1	58
2021 Q2	72
2021 Q3	80
2021 Q4	68
2022 Q1	66
2022 Q2	80
2022 Q3	88
2022 Q4	76
2023 Q1	74
2023 Q2	88
2023 Q3	96
2023 Q4	84

(a) Work out the 4-point moving average for the first four quarters.

(b) Work out the 4-point centred moving average for the 2022 Q1 quarter.

(c) State the seasonal effect for 2022 Q1, that is the value minus the centred moving average.

(Total for Question 1 is 5 marks)

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2 The table gives the number of visitors, in hundreds, to a seaside cafe each week.

Time	Visitors
week 1	39
week 2	49
week 3	49
week 4	50
week 5	58
week 6	59
week 7	56

Give decimal answers to 1 decimal place.

(a) Work out all the 3-point moving averages for this data.

(b) Describe the trend shown by the moving averages.

(c) Use the last two of these moving averages to estimate the next moving average, assuming the trend continues.

(Total for Question 2 is 5 marks)

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3 The table shows quarterly figures for monthly sales, in thousands of pounds, at a shop.

Quarter	Value
2021 Q1	45
2021 Q2	63
2021 Q3	70
2021 Q4	56
2022 Q1	57
2022 Q2	75
2022 Q3	82
2022 Q4	68
2023 Q1	69
2023 Q2	87
2023 Q3	94
2023 Q4	80

(a) Work out the 4-point moving average for the first four quarters.

(b) Work out the 4-point centred moving average for the 2021 Q4 quarter.

(c) State the seasonal effect for 2021 Q4, that is the value minus the centred moving average.

(Total for Question 3 is 5 marks)

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4 The table shows quarterly figures for the number of customers at a garden centre each month, in hundreds.

Quarter	Value
2020 Q1	47
2020 Q2	61
2020 Q3	71
2020 Q4	57
2021 Q1	55
2021 Q2	69
2021 Q3	79
2021 Q4	65
2022 Q1	63
2022 Q2	77
2022 Q3	87
2022 Q4	73

(a) Work out the 4-point moving average for the first four quarters.
(b) Work out the 4-point centred moving average for the 2020 Q4 quarter.
(c) State the seasonal effect for 2020 Q4, that is the value minus the centred moving average.

(Total for Question 4 is 5 marks)

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5 The table gives the number of visitors, in hundreds, to a seaside cafe each week.

Time	Visitors
week 1	57
week 2	62
week 3	63
week 4	74
week 5	79
week 6	85
week 7	79

Give decimal answers to 1 decimal place.

(a) Work out all the 3-point moving averages for this data.

(b) Describe the trend shown by the moving averages.

(c) Use the last two of these moving averages to estimate the next moving average, assuming the trend continues.

(Total for Question 5 is 5 marks)

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6 The table shows quarterly figures for monthly sales, in thousands of pounds, at a shop.

Quarter	Value
2020 Q1	49
2020 Q2	66
2020 Q3	82
2020 Q4	63
2021 Q1	65
2021 Q2	82
2021 Q3	98
2021 Q4	79
2022 Q1	81
2022 Q2	98
2022 Q3	114
2022 Q4	95

(a) Work out the 4-point moving average for the first four quarters.

(b) Work out the 4-point centred moving average for the 2021 Q1 quarter.

(c) State the seasonal effect for 2021 Q1, that is the value minus the centred moving average.

(Total for Question 6 is 5 marks)

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Mark scheme · 4.8 Time Series: 30-minute Pack

Question 1

adds four consecutive values and divides by 4	**M1**
69.5 cao	**A1**
averages two consecutive 4-point moving averages	**M1**
74.5 cao	**A1**
-8.5 cao	**B1**

Answer: (a) 69.5; (b) 74.5; (c) -8.5

Question 2

adds three consecutive values and divides by 3	**M1**
all 5 moving averages 45.7, 49.3, 52.3, 55.7, 57.7 cao	**A1**
trend is increasing	**B1**
last moving average plus (last minus the one before)	**M1**
59.7 cao	**A1**

Answer: (a) 45.7, 49.3, 52.3, 55.7, 57.7; (b) increasing; (c) 59.7

Question 3

adds four consecutive values and divides by 4	**M1**
58.5 cao	**A1**
averages two consecutive 4-point moving averages	**M1**
63 cao	**A1**
-7 cao	**B1**

Answer: (a) 58.5; (b) 63; (c) -7

Question 4

adds four consecutive values and divides by 4	**M1**
59 cao	**A1**
averages two consecutive 4-point moving averages	**M1**
62 cao	**A1**
-5 cao	**B1**

Answer: (a) 59; (b) 62; (c) -5

Question 5

adds three consecutive values and divides by 3	**M1**
all 5 moving averages 60.7, 66.3, 72, 79.3, 81 cao	**A1**
trend is increasing	**B1**
last moving average plus (last minus the one before)	**M1**
82.7 cao	**A1**

Answer: (a) 60.7, 66.3, 72, 79.3, 81; (b) increasing; (c) 82.7

Question 6

adds four consecutive values and divides by 4	**M1**
65 cao	**A1**
averages two consecutive 4-point moving averages	**M1**
75 cao	**A1**
-10 cao	**B1**

Answer: (a) 65; (b) 75; (c) -10

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