4.8 Time Series: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

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

Quarter	Value
2020 Q1	48
2020 Q2	61
2020 Q3	66
2020 Q4	56
2021 Q1	56
2021 Q2	69
2021 Q3	74
2021 Q4	64
2022 Q1	64
2022 Q2	77
2022 Q3	82
2022 Q4	72

(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 Q3 quarter.
(c) State the seasonal effect for 2020 Q3, 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 ice creams sold at a stall each week.

Time	Ice creams
week 1	39
week 2	37
week 3	45
week 4	42
week 5	53
week 6	50
week 7	54

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 the number of visitors, in hundreds, to a seaside cafe each day.

Quarter	Value
2021 Q1	46
2021 Q2	60
2021 Q3	71
2021 Q4	62
2022 Q1	58
2022 Q2	72
2022 Q3	83
2022 Q4	74
2023 Q1	70
2023 Q2	84
2023 Q3	95
2023 Q4	86

(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 Q3 quarter.

(c) State the seasonal effect for 2021 Q3, 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 daily number of hot drinks sold at a kiosk.

Quarter	Value
2022 Q1	61
2022 Q2	72
2022 Q3	84
2022 Q4	69
2023 Q1	69
2023 Q2	80
2023 Q3	92
2023 Q4	77
2024 Q1	77
2024 Q2	88
2024 Q3	100
2024 Q4	85

(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 Q4 quarter.

(c) State the seasonal effect for 2022 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 ice creams sold at a stall each week.

Time	Ice creams
week 1	58
week 2	58
week 3	54
week 4	66
week 5	62
week 6	65

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 the number of visitors, in hundreds, to a seaside cafe each day.

Quarter	Value
2019 Q1	69
2019 Q2	83
2019 Q3	92
2019 Q4	83
2020 Q1	77
2020 Q2	91
2020 Q3	100
2020 Q4	91
2021 Q1	85
2021 Q2	99
2021 Q3	108
2021 Q4	99

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

(b) Work out the 4-point centred moving average for the 2019 Q3 quarter.

(c) State the seasonal effect for 2019 Q3, that is the value minus the centred moving average.

(Total for Question 6 is 5 marks)

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

Quarter	Value
2019 Q1	59
2019 Q2	77
2019 Q3	86
2019 Q4	77
2020 Q1	71
2020 Q2	89
2020 Q3	98
2020 Q4	89
2021 Q1	83
2021 Q2	101
2021 Q3	110
2021 Q4	101

(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 Q1 quarter.
(c) State the seasonal effect for 2020 Q1, that is the value minus the centred moving average.

(Total for Question 7 is 5 marks)

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8 The table gives weekly sales, in thousands of pounds, at a shop.

Time	Sales
week 1	41
week 2	33
week 3	27
week 4	30
week 5	34
week 6	29
week 7	28

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 8 is 5 marks)

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

Quarter	Value
2019 Q1	68
2019 Q2	80
2019 Q3	98
2019 Q4	80
2020 Q1	84
2020 Q2	96
2020 Q3	114
2020 Q4	96
2021 Q1	100
2021 Q2	112
2021 Q3	130
2021 Q4	112

(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 Q1 quarter.
(c) State the seasonal effect for 2020 Q1, that is the value minus the centred moving average.

(Total for Question 9 is 5 marks)

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

Quarter	Value
2021 Q1	50
2021 Q2	64
2021 Q3	78
2021 Q4	68
2022 Q1	62
2022 Q2	76
2022 Q3	90
2022 Q4	80
2023 Q1	74
2023 Q2	88
2023 Q3	102
2023 Q4	92

(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 10 is 5 marks)

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11 The table gives weekly sales, in thousands of pounds, at a shop.

Time	Sales
week 1	40
week 2	42
week 3	47
week 4	42
week 5	41
week 6	51
week 7	58
week 8	55

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 11 is 5 marks)

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

Quarter	Value
2021 Q1	54
2021 Q2	75
2021 Q3	84
2021 Q4	71
2022 Q1	70
2022 Q2	91
2022 Q3	100
2022 Q4	87
2023 Q1	86
2023 Q2	107
2023 Q3	116
2023 Q4	103

(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 12 is 5 marks)

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Mark scheme · 4.8 Time Series: 1-hour Pack

Question 1

adds four consecutive values and divides by 4	M1
57.75 cao	A1
averages two consecutive 4-point moving averages	M1
58.75 cao	A1
7.25 cao	B1

Answer: (a) 57.75; (b) 58.75; (c) 7.25

Question 2

adds three consecutive values and divides by 3	M1
all 5 moving averages 40.3, 41.3, 46.7, 48.3, 52.3 cao	A1
trend is increasing	B1
last moving average plus (last minus the one before)	M1
56.3 cao	A1

Answer: (a) 40.3, 41.3, 46.7, 48.3, 52.3; (b) increasing; (c) 56.3

Question 3

adds four consecutive values and divides by 4	M1
59.75 cao	A1
averages two consecutive 4-point moving averages	M1
61.25 cao	A1
9.75 cao	B1

Answer: (a) 59.75; (b) 61.25; (c) 9.75

Question 4

adds four consecutive values and divides by 4	M1
71.5 cao	A1
averages two consecutive 4-point moving averages	M1
74.5 cao	A1
-5.5 cao	B1

Answer: (a) 71.5; (b) 74.5; (c) -5.5

Question 5

adds three consecutive values and divides by 3	M1
all 4 moving averages 56.7, 59.3, 60.7, 64.3 cao	A1
trend is increasing	B1
last moving average plus (last minus the one before)	M1
68 (accept 67.9, from moving averages rounded to 1 decimal place)	A1

Answer: (a) 56.7, 59.3, 60.7, 64.3; (b) increasing; (c) 68

Question 6

adds four consecutive values and divides by 4	M1
81.75 cao	A1
averages two consecutive 4-point moving averages	M1
82.75 cao	A1
9.25 cao	B1

Answer: (a) 81.75; (b) 82.75; (c) 9.25

Question 7

adds four consecutive values and divides by 4	M1
74.75 cao	A1
averages two consecutive 4-point moving averages	M1
82.25 cao	A1
-11.25 cao	B1

Answer: (a) 74.75; (b) 82.25; (c) -11.25

Question 8

adds three consecutive values and divides by 3	M1
all 5 moving averages 33.7, 30, 30.3, 31, 30.3 cao	A1
trend is generally decreasing (accept a description that notes the overall fall with a small dip or levelling)	B1
last moving average plus (last minus the one before)	M1
29.7 (accept 29.6, from moving averages rounded to 1 decimal place)	A1

Answer: (a) 33.7, 30, 30.3, 31, 30.3; (b) generally decreasing; (c) 29.7

Question 9

adds four consecutive values and divides by 4	M1
81.5 cao	A1
averages two consecutive 4-point moving averages	M1
91.5 cao	A1
-7.5 cao	B1

Answer: (a) 81.5; (b) 91.5; (c) -7.5

Question 10

adds four consecutive values and divides by 4	M1
65 cao	A1
averages two consecutive 4-point moving averages	M1
69.5 cao	A1
-1.5 cao	B1

Answer: (a) 65; (b) 69.5; (c) -1.5

Question 11

adds three consecutive values and divides by 3	M1
all 6 moving averages 43, 43.7, 43.3, 44.7, 50, 54.7 cao	A1
trend is generally increasing (accept a description that notes the overall rise with a small dip or levelling)	B1
last moving average plus (last minus the one before)	M1
59.3 (accept 59.4, from moving averages rounded to 1 decimal place)	A1

Answer: (a) 43, 43.7, 43.3, 44.7, 50, 54.7; (b) generally increasing; (c) 59.3

Question 12

adds four consecutive values and divides by 4	M1
71 cao	A1
averages two consecutive 4-point moving averages	M1
81 cao	A1
-11 cao	B1

Answer: (a) 71; (b) 81; (c) -11

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