education equals

Topic: Analysing Time Series Graphs

Time: 45 mins Marks: /45 marks

No calculator allowed

Question One: [2, 2, 2, 2, 2: 10 marks]

Which of the following situations involve time series data?

a) Comparing the average price of petrol each day by recording the average price and the day of the week for three consecutive weeks.

b) Recording data on the size of the ocean's tides at 6 hour intervals by recording the level of the tide and the time of day for 5 consecutive days.

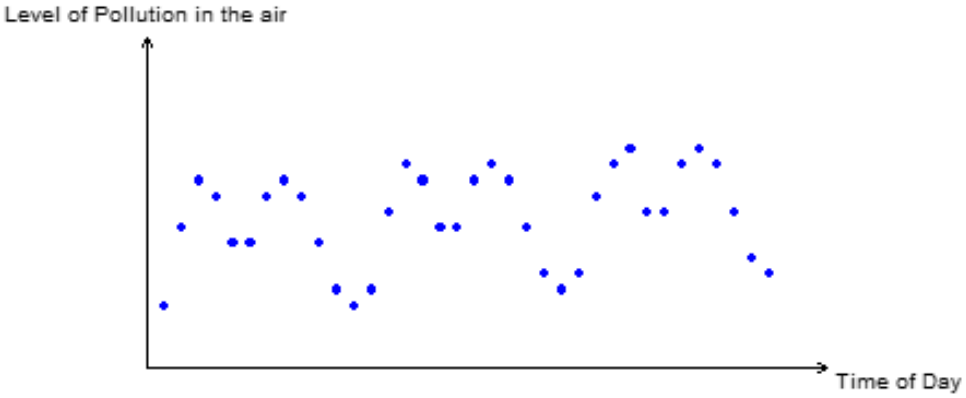
c) Comparing the fastest running time for each student in the class by recording their fastest time each day for 3 consecutive days.

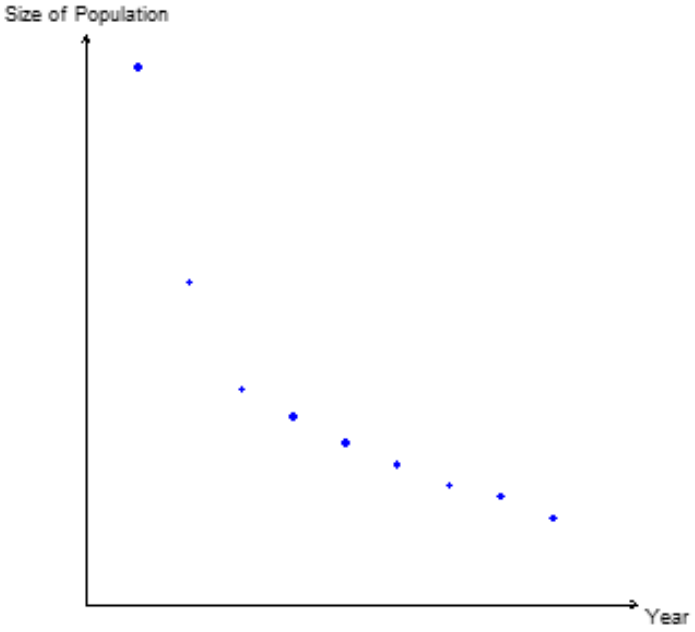
d) Recording the total sales figures for retail store each day by recording the total number of sales and the day of the week over one month.

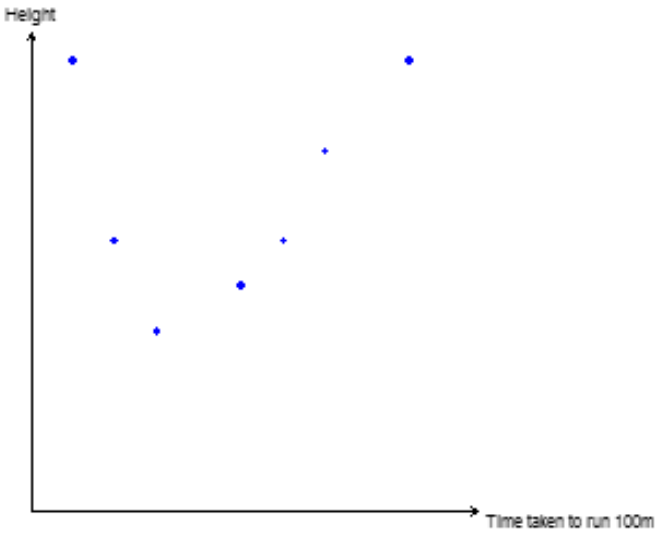
e) Recording how much pollution is in the air at the exact same time of day in several different locations.

Question Two: [5 marks]

Which of the following graphs depict time series data and for those which do, describe the trend.



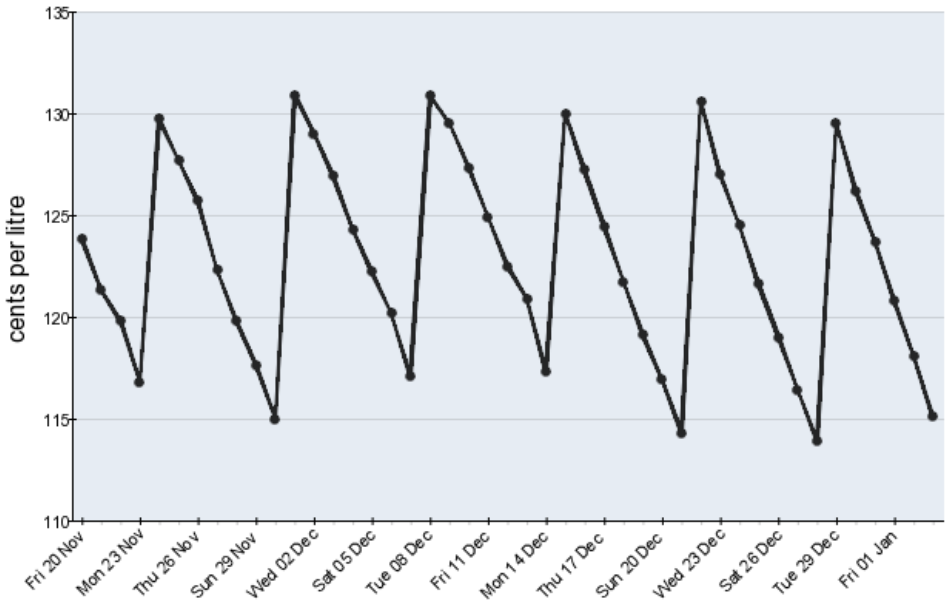




Question Three: [2, 2, 2, 2: 8 marks]

State the likely length of the cycle for data shown in the graph and table and for the scenario described below.

a) Daily petrol prices.

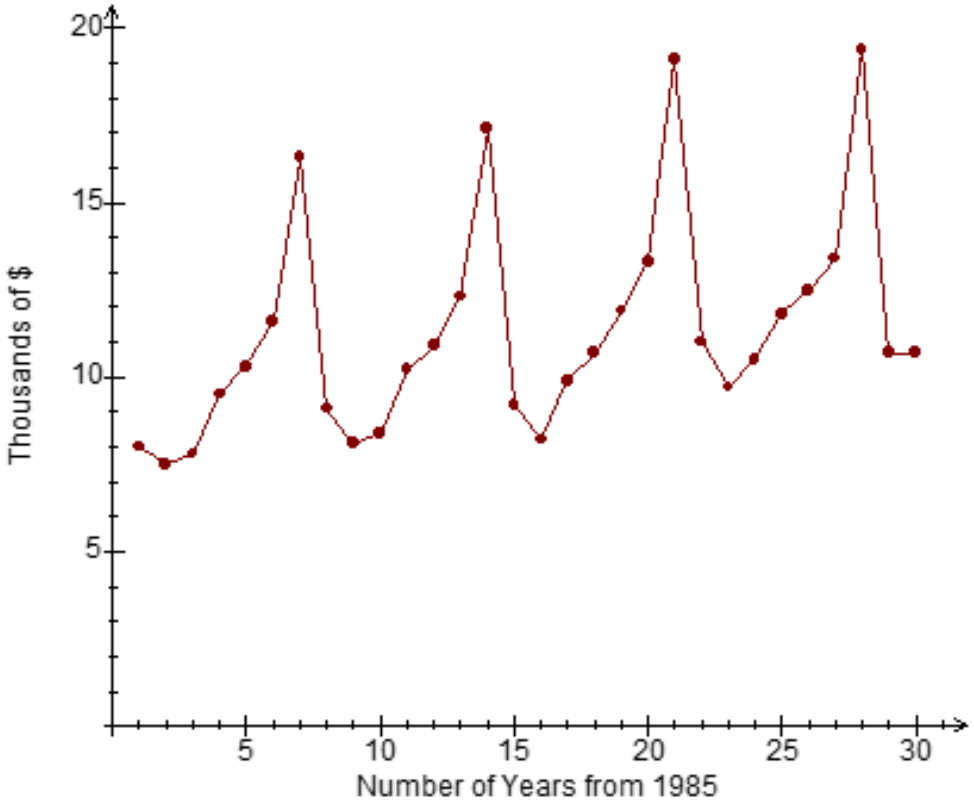


Source: FUELtrac

b) Number of visitors to a seaside town.

Year	2013	2013	2013	2013	2014	2014	2014	2014	2015
Quarter	1	2	3	4	1	2	3	4	1
Visitors (0000's)	15	25	9	7	13	22	10	8	12

c) A company's sales figures.



d) Attendance at a weekly course.

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Attendance (100s of people)	10.9	11.5	11.3	11.4	6.2	12.2	11.4	11.1	12	5.9	12.4	13.1	11.3	12.9	6.3

Question Four: [2, 2: 4 marks]

a) Joe Blog wants to buy shares, there are several shares which today cost the same price. Suggest a way in which he might be able to decide which share to buy.

b) How can collecting prices of properties be analysed as time series data?

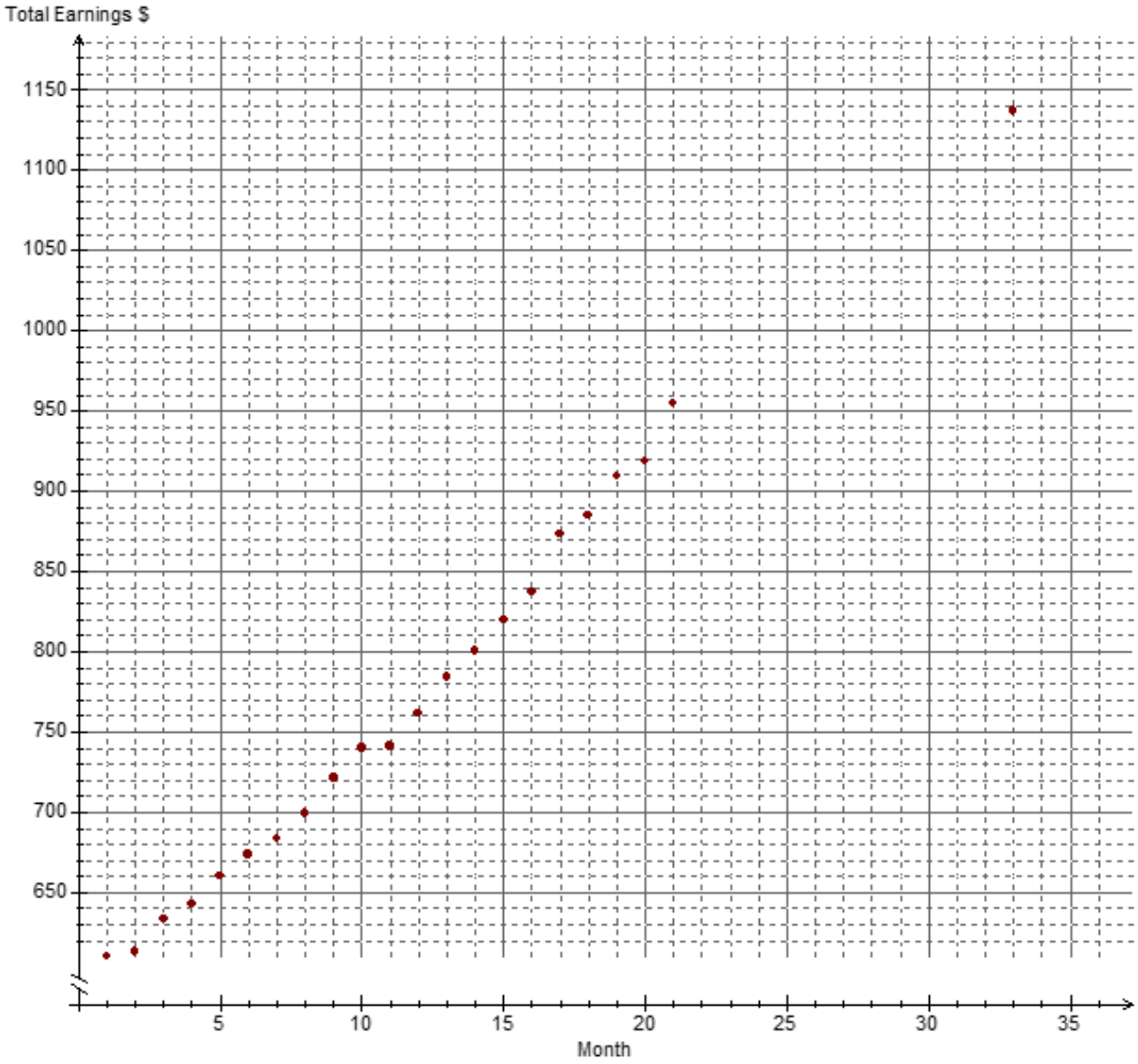
Question Five: [2, 4, 2: 8 marks]

The following data has been provided by the Australian Bureau of statistics and shows the average total earnings of Australian males and females. The data was collected biannually and is shown in the table below.

	Month – Year	Total Earnings $
1	May-1999	610.40
2	Nov-1999	613.00
3	May-2000	633.80
4	Nov-2000	643.10
5	May-2001	660.30
6	Nov-2001	673.60
7	May-2002	683.80
8	Nov-2002	699.40
9	May-2003	721.40
10	Nov-2003	740.30
11	May-2004	741.40
12	Nov-2004	761.70
13	May-2005	784.20
14	Nov-2005	800.60
15	May-2006	819.70
16	Nov-2006	837.40
17	May-2007	858.50
18	Nov-2007	873.20
19	May-2008	885.00
20	Nov-2008	909.50
21	May-2009	918.60
22	Nov-2009	955.00
23	May-2010	977.10
24	Nov-2010	996.10
25	May-2011	1015.20
26	Nov-2011	1033.70
27	May-2012	1053.20
28	Nov-2012	1081.30
29	May-2013	1105.00
30	Nov-2013	1114.20
31	May-2014	1123.00
32	Nov-2014	1128.70
33	May-2015	1136.90

a) What makes this “time series data”?

b) Complete the scatterplot of the data below.



c) Describe the overall trend of the data.

Question Six: [2, 2, 6: 10 marks]

The following data has been provided by the Australian Bureau of statistics and shows the total number of employed persons in Australia in the 1000s. The data was collected monthly and is shown in the table below.

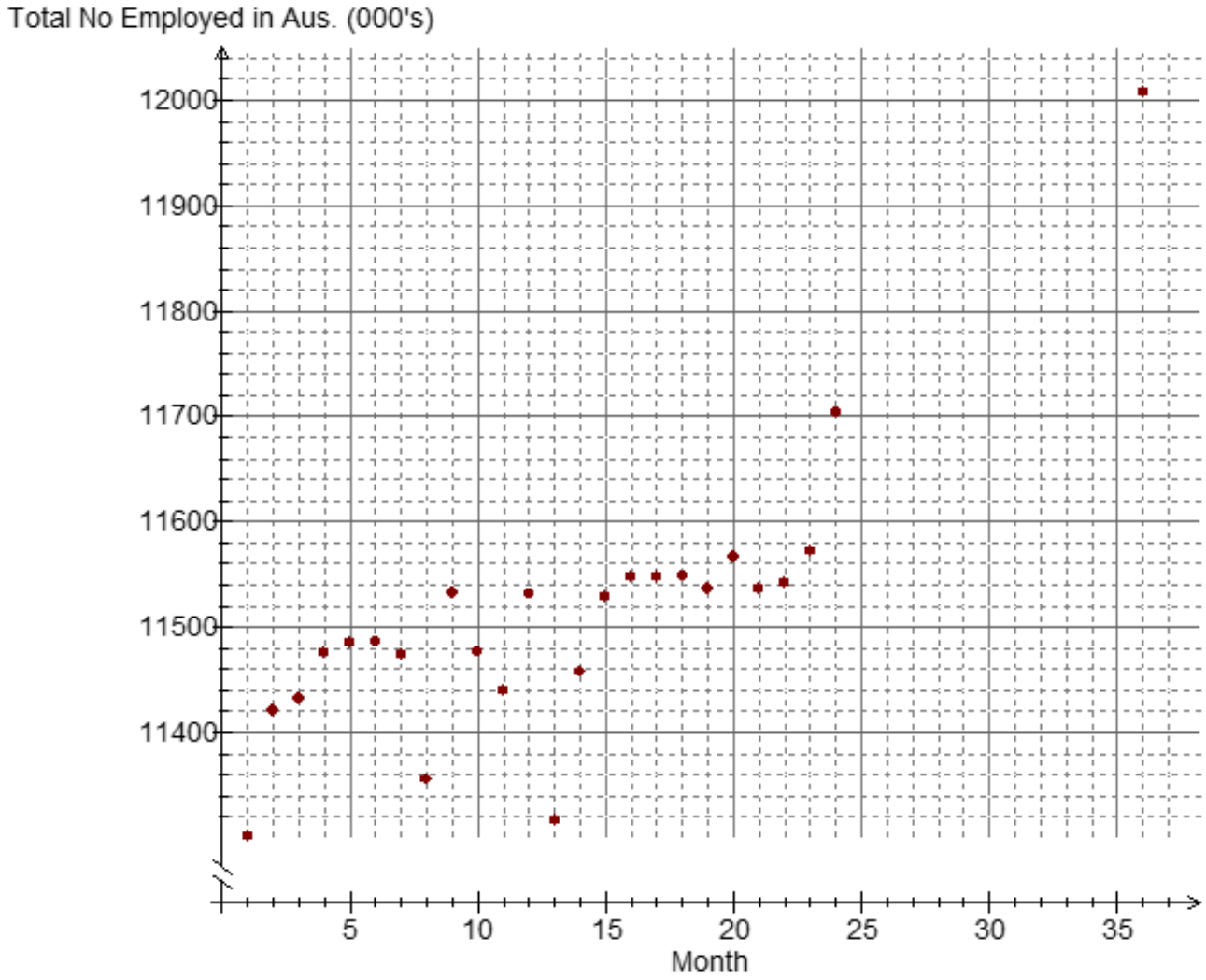
Month-Year	Total number of employed persons in Australia 000's
Jan-2013	11301.0
Feb-2013	11420.1
Mar-2013	11431.5
Apr-2013	11475.4
May-2013	11485.4
Jun-2013	11485.8
Jul-2013	11473.8
Aug-2013	11355.6
Sep-2013	11533.0
Oct-2013	11476.5
Nov-2013	11439.8
Dec-2013	11531.2
Jan-2014	11316.8
Feb-2014	11457.5
Mar-2014	11528.4
Apr-2014	11548.0
May-2014	11547.6
Jun-2014	11548.6
Jul-2014	11535.6
Aug-2014	11566.6
Sep-2014	11535.8
Oct-2014	11542.4
Nov-2014	11572.7
Dec-2014	11703.6
Jan-2015	11454.5
Feb-2015	11710.2
Mar-2015	11684.6
Apr-2015	11694.3
May-2015	11764.2
Jun-2015	11735.1
Jul-2015	11743.8
Aug-2015	11686.3
Sep-2015	11756.9
Oct-2015	11849.5
Nov-2015	11919.1
Dec-2015	12007.5

a) What are two ways in which this data may have been collected?

b) List two reasons why collecting this data might be useful?

The first 24 data points have been graphed below.

c) Graph the last 12 data points and describe the overall trend for employment in Australia over the past three years.



education equals

Topic: SOLUTIONS

Time: 45 mins Marks: /45 marks

No calculator allowed

Question One: [2, 2, 2, 2, 2: 10 marks]

Which of the following situations involve time series data?

a) Comparing the average price of petrol each day by recording the average price and the day of the week for three consecutive weeks.

Time series ✓✓

b) Recording data on the size of the ocean's tides at 6 hour intervals by recording the level of the tide and the time of day for 5 consecutive days.

Time series ✓✓

c) Comparing the fastest running time for each student in the class by recording their fastest time each day for 3 consecutive days.

Not time series ✓✓

d) Recording the total sales figures for retail store each day by recording the total number of sales and the day of the week over one month.

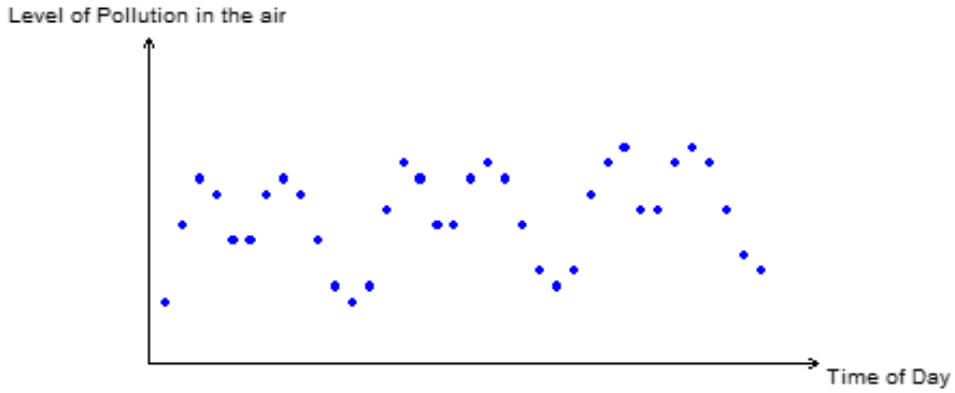
Time series ✓✓

e) Recording how much pollution is in the air at the exact same time of day in several different locations.

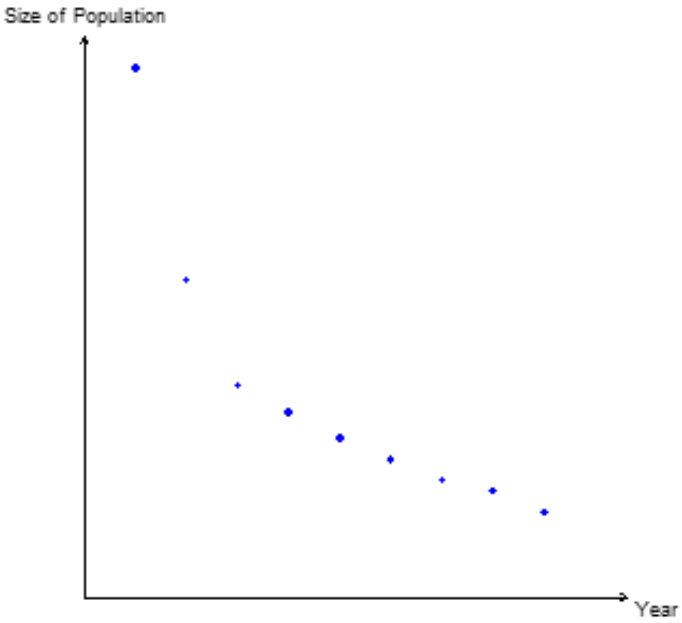
Not time series ✓✓

Question Two: [5 marks]

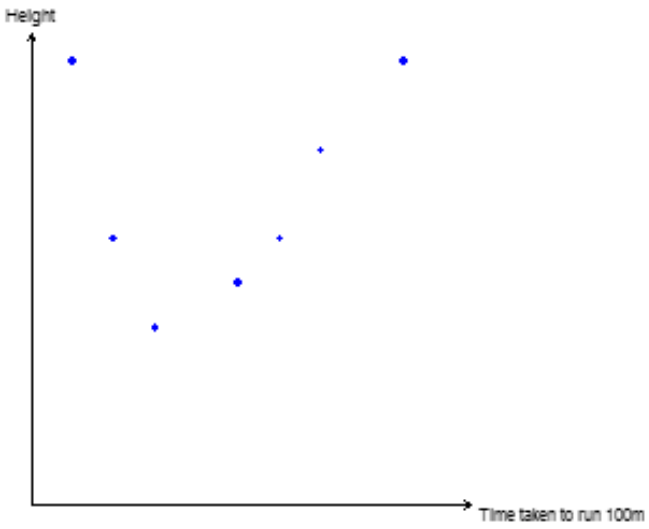
Which of the following graphs depict time series data and for those which do, describe the trend.



Time series. ✓
Slightly
increasing trend. ✓



Time series. Reducing trend. ✓ ✓

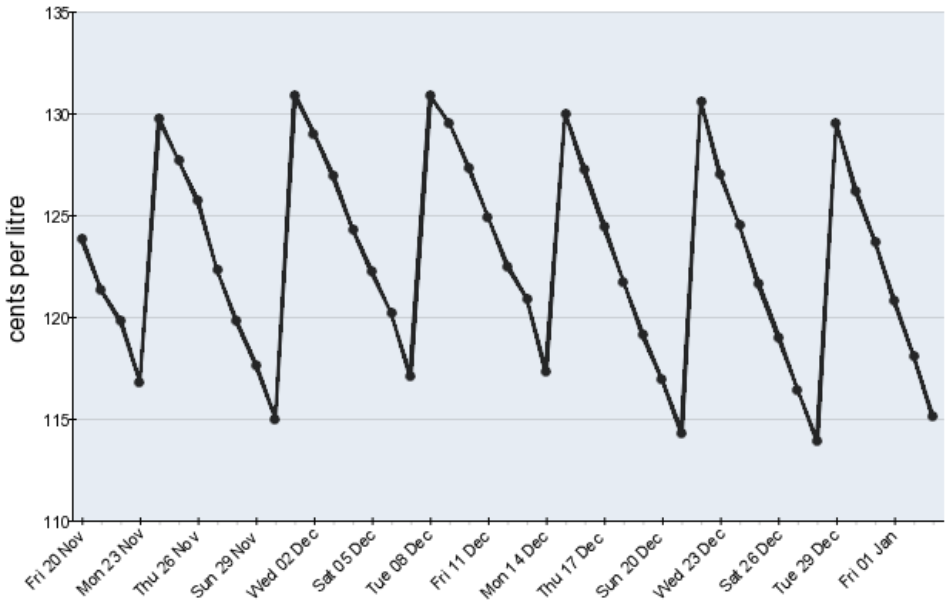


Not time series. ✓

Question Three: [2, 2, 2, 2: 8 marks]

State the likely length of the cycle for data shown in the graph and table and for the scenario described below.

a) Daily petrol prices.



Source: FUELtrac

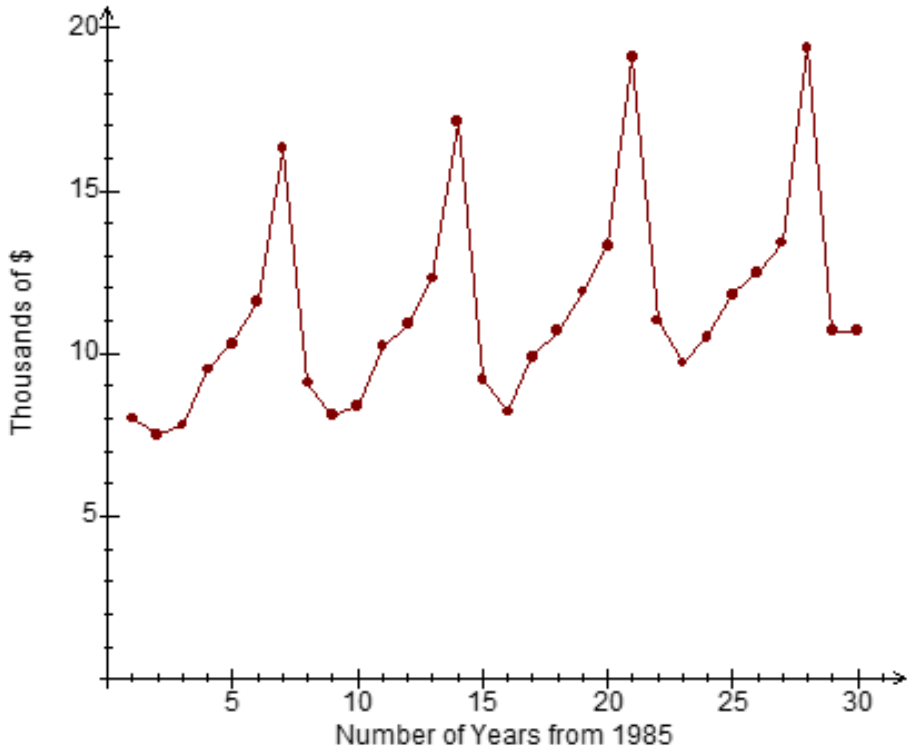
7 day cycle ✓✓

b) Number of visitors to a seaside town.

Year	2013	2013	2013	2013	2014	2014	2014	2014	2015
Quarter	1	2	3	4	1	2	3	4	1
Visitors (0000's)	15	25	9	7	13	22	10	8	12

4 point cycle ✓✓

c) A company's sales figures.



A 7 year cycle

✓ ✓

d) Attendance at a weekly course.

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Attendance (100s of people)	10.9	11.5	11.3	11.4	6.2	12.2	11.4	11.1	12	5.9	12.4	13.1	11.3	12.9	6.3

5 week cycle

✓ ✓

Question Four: [2, 2: 4 marks]

a) Joe Blog wants to buy shares, there are several shares which today cost the same price. Suggest a way in which he might be able to decide which share to buy.

Consider the history of the share process over time to determine if any long term patterns exist and buy the share which shows the highest prediction for future growth.

✓ ✓

b) How can collecting prices of properties be analysed as time series data?

Finding the average price of properties in a particular suburb each month over several months.

✓ ✓

Question Five: [2, 4, 2: 8 marks]

The following data has been provided by the Australian Bureau of statistics and shows the average total earnings of Australian males and females. The data was collected biannually and is shown in the table below.

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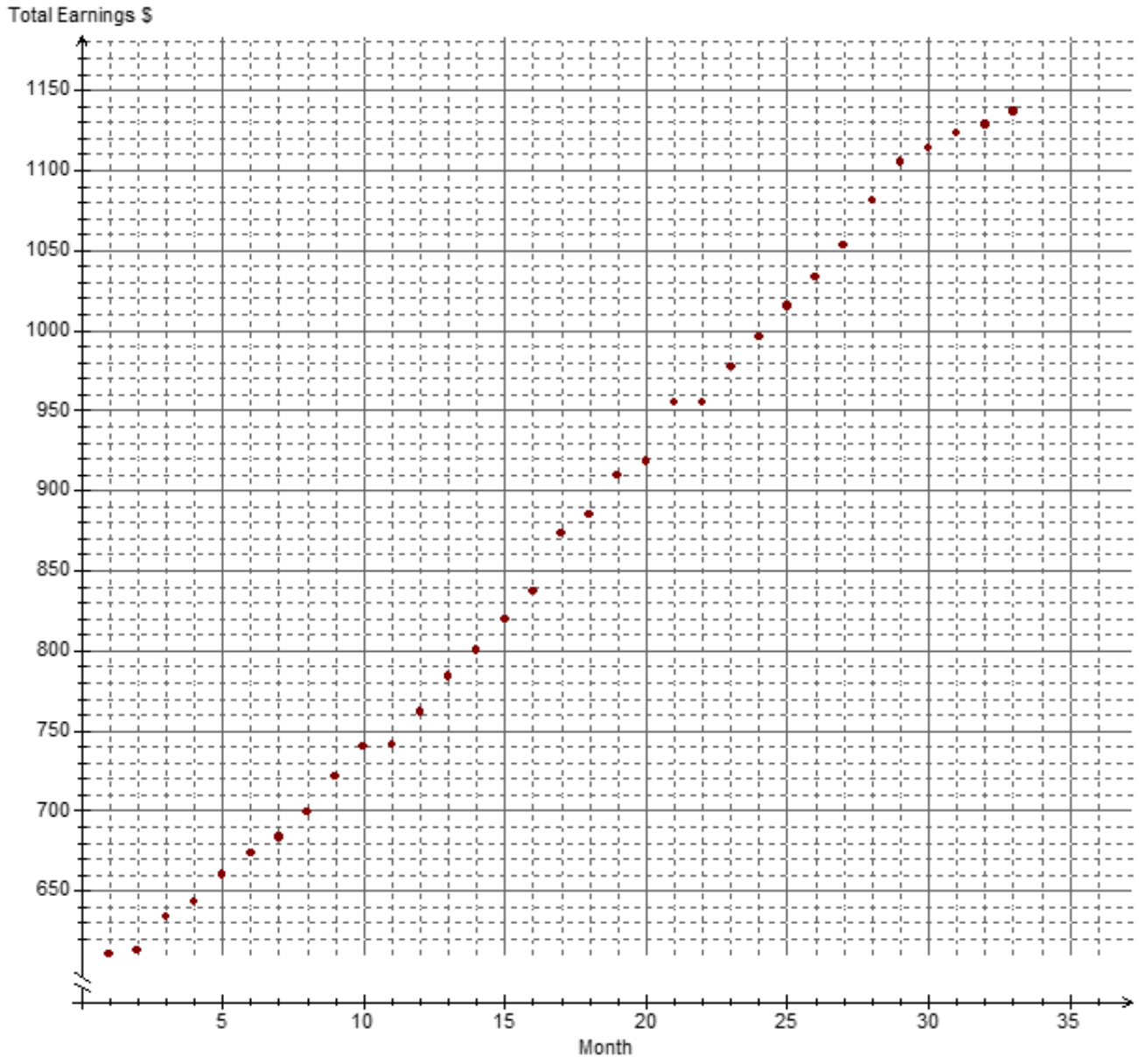
32	Nov-2014	1128.70
33	May-2015	1136.90

a) What makes this “time series data”?

The data is collected over time. Every May and November for several years.

✓✓

b) Complete the scatterplot of the data below.



✓ ✓ ✓ ✓

c) Describe the overall trend of the data.

Increasing earnings over time. ✓ ✓

Question Six: [2, 2, 6: 10 marks]

The following data has been provided by the Australian Bureau of statistics and shows the total number of employed persons in Australia in the 1000s. The data was collected monthly and is shown in the table below.

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Oct-2015	11849.5
Nov-2015	11919.1
Dec-2015	12007.5

a) What are two ways in which this data may have been collected?

Asking business's to report their number of employees. ✓ ✓

A national census. (Only one answer necessary, other answers will exist)

b) List two reasons why collecting this data might be useful?

To analyse the overall well-being of the nation, to budget for welfare payments (other answers will exist). ✓ ✓

The first 24 data points and the last data point have been graphed below.

c) Graph the last 11 data points and describe the overall trend for employment in Australia over the past three years.

Generally increasing trend. ✓✓