

WS Test 4 Revision

Knowledge Test

1. What does crude birth rate indicate?
2. What does a standardised population represent?
3. What is the difference between the consumer price index (CPI) and the retail price index (RPI)?
4. What is the difference between the spearman's rank correlation coefficient (SRCC) and the product moment correlation coefficient (PMCC)?
5. What does a PMCC of 1 indicate?
6. When would a correlation generally be considered to be 'strong' correlation?
7. When would a correlation generally be considered to be a 'weak' correlation?

Crude Rates of Change (Formulae Provided)

1. In 2016 there were 38312 people in a town.
 - a) If 432 people died what was the crude death rate?
 - b) Interpret the meaning of this number.
2. In 2016 there were 1305 members of a village with 13 births.
 - a) What is the crude birth rate?
 - b) Interpret the meaning of this number.

3. The demographic of a small town is given in the table below:

Age Group	Frequency	Birth Rate
0-19	2812	22.9
20-35	15611	25.0
36-65	19062	13.1
65+	10001	0

a) Calculate the number of people in each age group in the standard population to 1 decimal place

e.g. 0-19: $\frac{2812}{47486} \times 1000 = 59.21 \dots \cong 59.2$

b) Calculate the standardised birth rate for the town

e.g. $\frac{22.9}{1000} \times 59.2 = 1.35568 \cong 1.4$

4. A village had 68 births and a crude birth rate of 10.1, show that the population is roughly 6733.

5. A village had 32 deaths and a crude death rate of 9.8, calculate the size of the population.

6. TMSN your understanding of crude rates of change

Index Numbers

1. The table below shows the average price of a 4 pint carton of milk between the years 2010 and 2012.

Year	2010	2011	2012
Price	112	120	121
Index Number (2010 is the base year)	100		
Chain Base Index	100		

- a) Calculate the missing index numbers and base index numbers.
- b) Which measure, the CPI or RPI, would be the most appropriate measure to compare this to and why?
- c) The CPI for the years 2011 and 2012 was 103.1, how does this compare to the change in the price of milk?

2. The table below shows the chain base numbers for the change in the average price of an ice cream between the years 2011 and 2013.

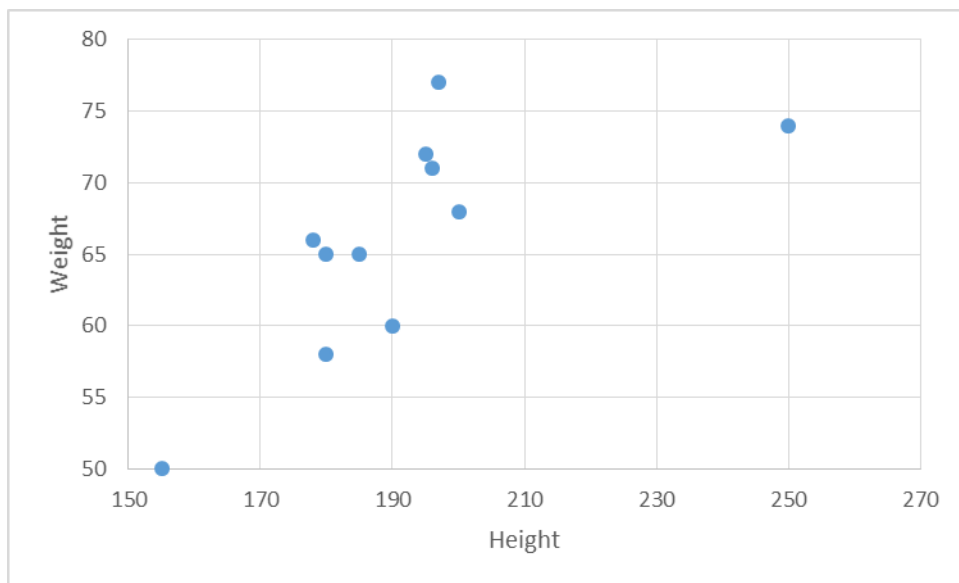
	2011	2012	2013
Chain Base Index	100	102.5	105

- a) Geraldine says 'For both of the years the price increase was 2.5%.' Explain why she is wrong.
- b) Harry's ice cream parlour sold vanilla ice cream for £2.10 in 2011 estimate the price of the ice cream in 2012.
- c) Estimate the price of the ice cream in 2013.
- d) Explain why your answers to b and c are only estimates.
- e) TMSN your understanding of index numbers

Scatter Diagrams

1. The data below is represented on the scatter diagram.

Height	155	190	250	196	149	180	185	197	195	180	178	200
Weight	50	60	74	71	55	58	65	77	72	65	66	68



- a) Would you expect the PMMC or SRCC to be stronger for this data? Why?

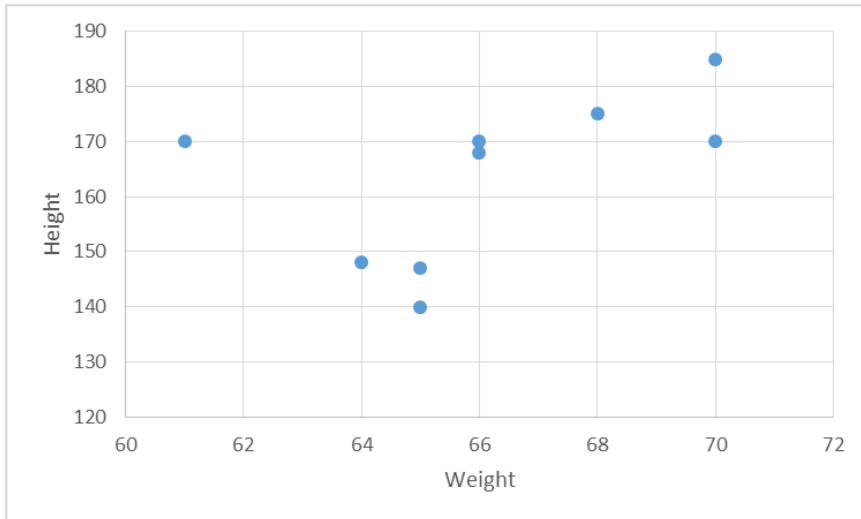
- b) Calculate the spearman's rank correlation coefficient. Use the blank parts of the table to help you.

- c) Interpret your answer from b)

2a) For the data below, calculate the double mean point (\bar{x}, \bar{y}) and plot this on the scatter diagram.

weight (kg)	70	61	68	66	70	65	64	65	66
Height (cm)	185	170	175	168	170	147	148	140	170

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b) Draw a line of best fit on the diagram.

c) Critique the scatter graph

d) Estimate the weight of a person who is 135cm tall. How valid is this estimate?

The equation of the trend line is found to be $h = 2.6w - 7.7$

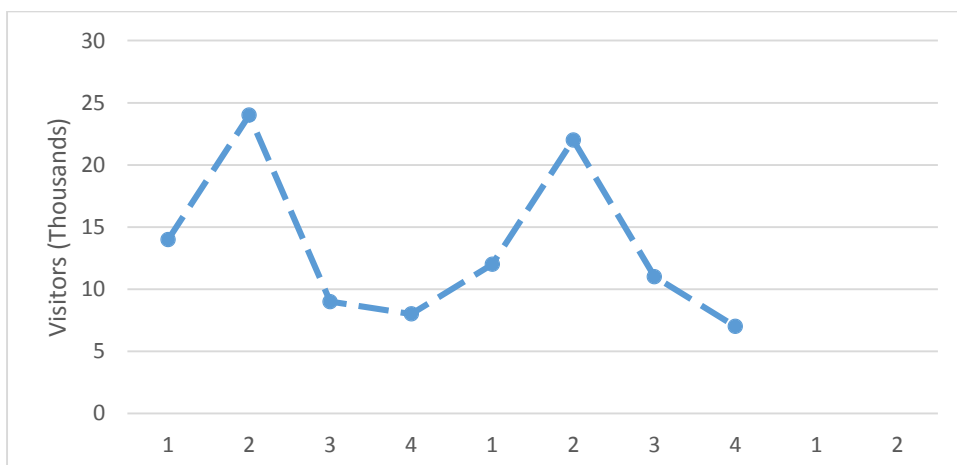
e) Interpret the meaning of the number 2.6

f) TMSN your understanding of scatter diagrams

Time Series

1. Jenny draws a time series to represent the number of visitors to her town:

Year	2005				2006			
Quarter	1	2	3	4	1	2	3	4
Visitors (th)	14	24	9	8	12	22	11	7



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a) Calculate the 4 point moving averages

e.g. $\frac{14+24+9+8}{4} = 13.75$

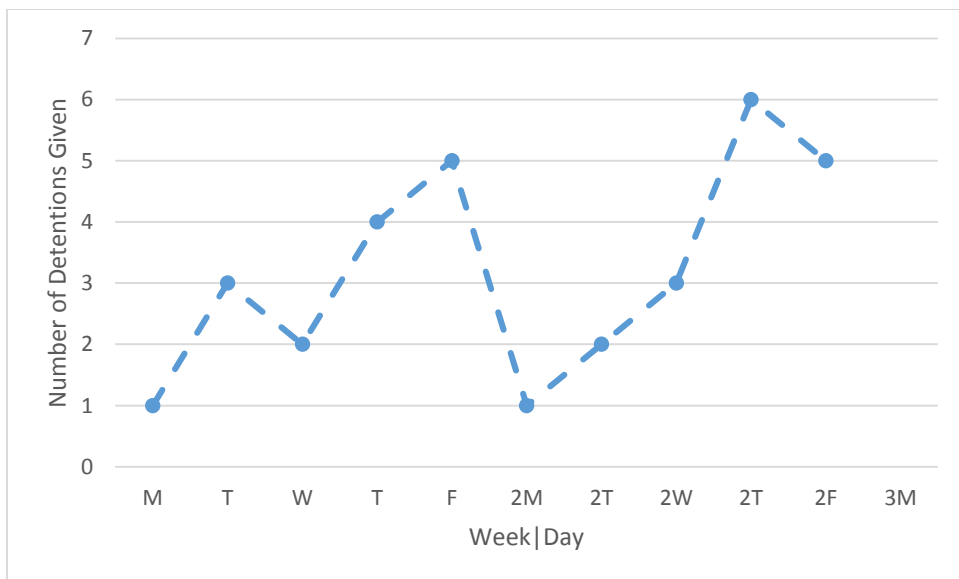
b) Plot these on the time series and hence draw a trend line for the data

c) State and interpret the trend

d) Calculate the mean seasonal variation for quarter 2

e) Hence use the time series to estimate the number of visitors in quarter 2 of 2007

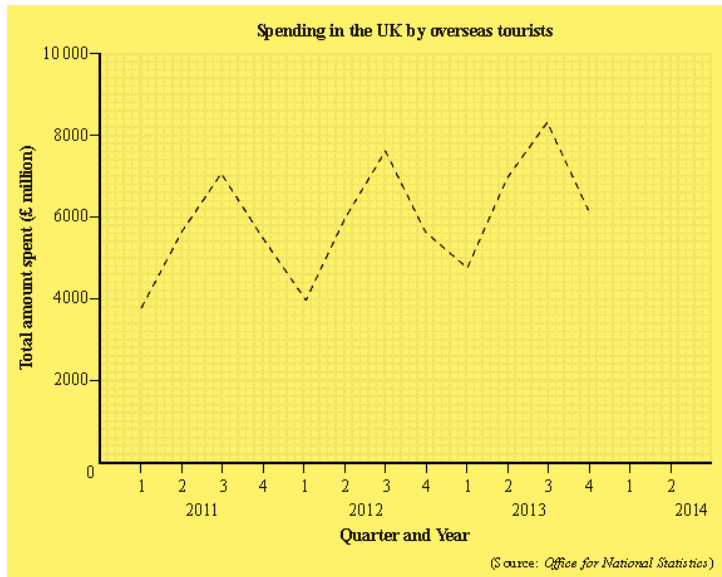
2a) For the data below calculate the 'mean seasonal variation' for a Monday.



b) Use this to estimate the number of detentions given in the Monday of week 3

3a) For the time series below calculate four point moving averages and use them to plot a trend line

Y	2011				2012				2013			
Q	1	2	3	4	1	2	3	4	1	2	3	4
Value	2800	5200	7000	5300	4000	5900	7600	5900	4800	7000	8300	6000
4 ->												



- b) Calculate the equation of your trend line and leave your answer in the form $y = ax + b$
- c) Interpret the value of a
- d) TMSN your understanding of time series