UNIT 20 *Statistics* Overhead Slides

Overhead Slides

OS 20.1 *Box and Whisker Plots*

The goals scored in the first 11 football matches played by a *Premier League* team were:

1 0 4 2 2 3 1 2 5 0 1

These data can be represented using a *box and whisker* plot.

1. Reorder the data, starting with the smallest. ☐

2. Identify: smallest value ☐ largest value ☐

   lower quartile ☐ upper quartile ☐

   median ☐

3. Construct a *box and whisker plot* above the scale below.

Construct a *box and whisker plot* below the scale for a team scoring

3 5 2 1 3 2 2 4 6 2 1

Compare the two sets of data.

OS 20.2 *Time Series Analysis*

Sunshine records for a British holiday resort

(average number of hours per day)

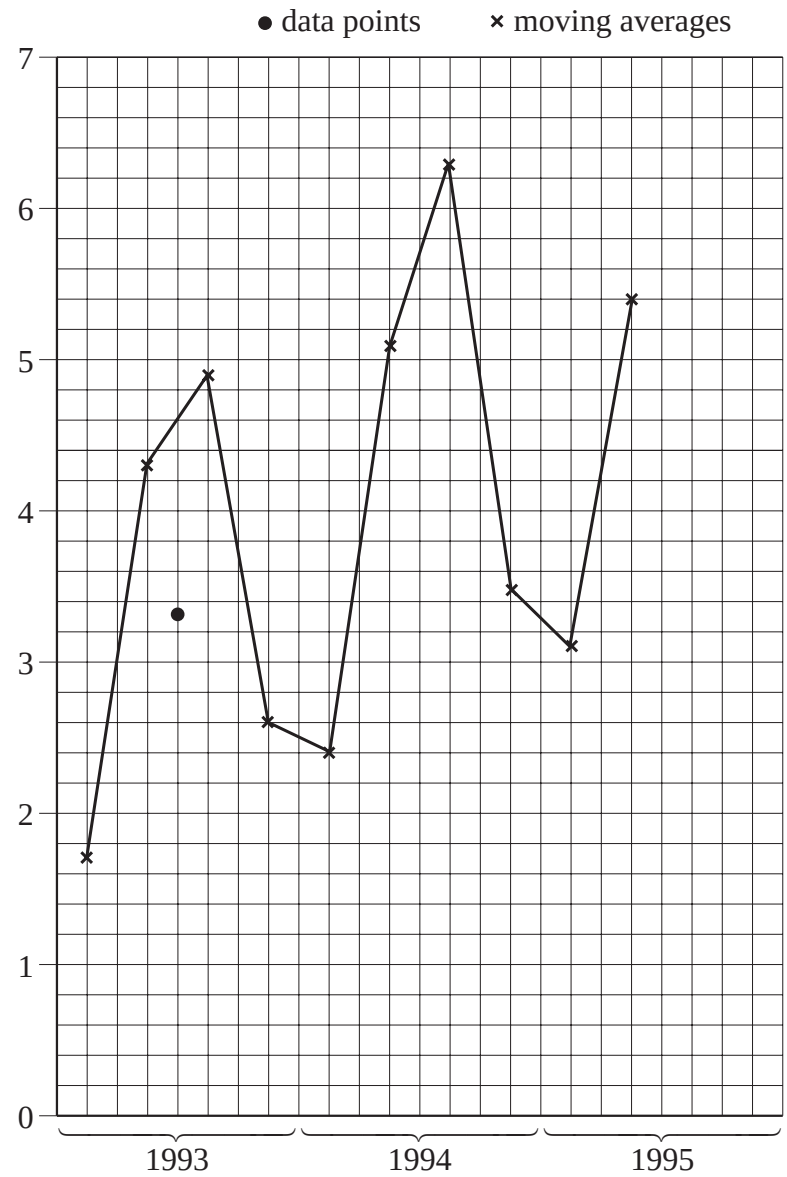
	Jan – Mar	*Apr – Jun*	*Jul – Sep*	*Oct – Dec*
1993	1.7	4.3	4.9	2.6
1994	2.4	5.1	6.3	3.5
1995	3.1	5.4	?	?

Complete the *4-point moving averages*, plot them and estimate the value of the next two data points.

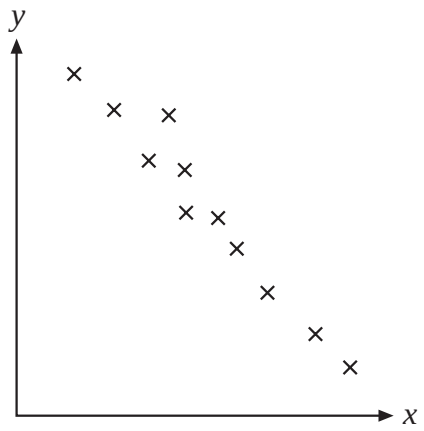
4-point moving averages

1.7
4.3
4.9
2.6
2.4
5.1
6.3
3.5
3.1
5.4

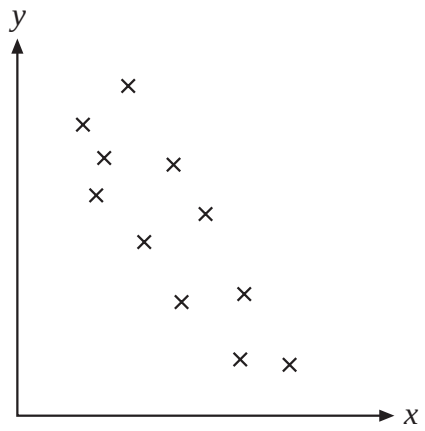
3.375



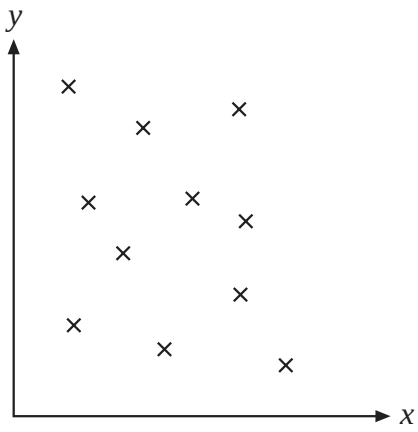
OS 20.3 *Correlation*



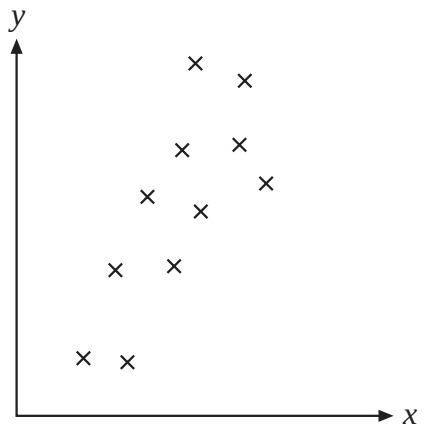
Strong *negative* correlation



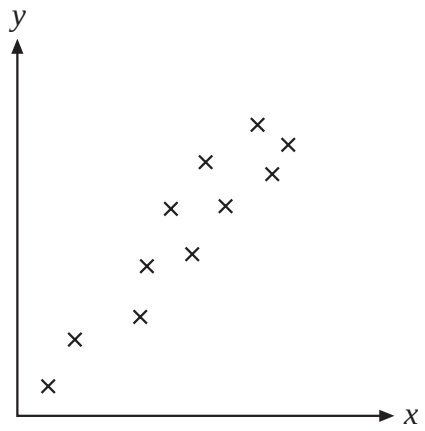
Weak *negative* correlation



No correlation



Weak *positive* correlation



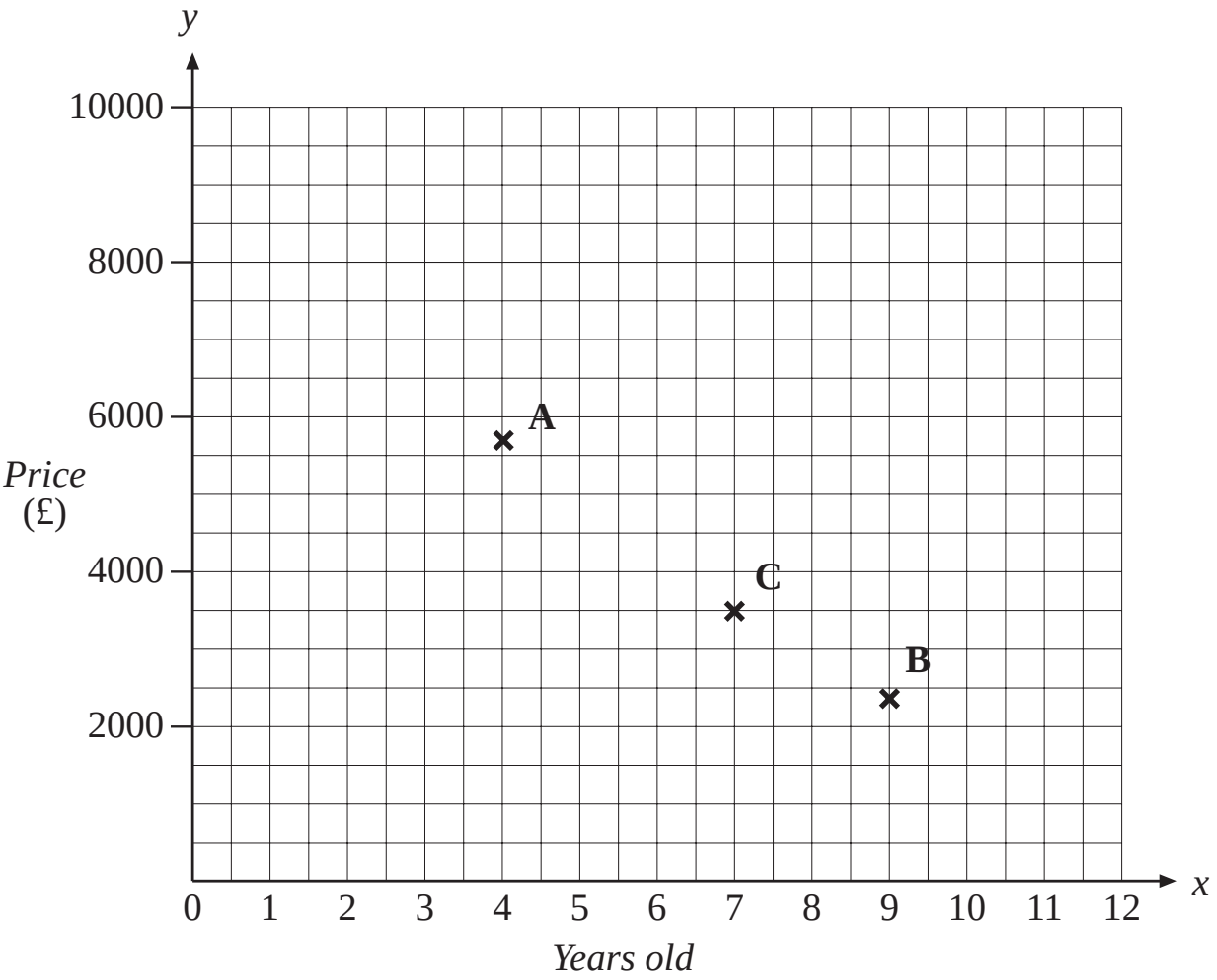
Strong *positive* correlation

OS 20.4 *Regression Lines*

A garage has six *Ford Escort* cars for sale. The prices and ages are:

CAR	**A**	**B**	**C**	**D**	**E**	**F**
Age (years)	4	9	7	3	6	8
Price (£)	5700	2200	3500	6500	4180	2760

Complete the scatter diagram below.



Draw a line of best fit.

Use it to estimate
- the price of a 1-year old *Ford Escort*
- the price of a 12-year old *Ford Escort.*

OS 20.5 *Spearman's Rank Correlation Coefficient*

Attendances at some of the most popular tourist attractions in the UK are shown below for the years 1991 and 1996.

Tourist Attraction	**1991**	**1996**	***Ranks*** **1991**	**1996**	d	d^2
Madame Tussard's	2.2	2.4				
Alton Towers	2.0	3.1				
Tower of London	1.9	1.6				
National History Museum	1.6	1.2				
Chessington World of Adventure	1.4	1.7				
Science Museum	1.4	1.3				
London Zoo	1.1	1.5				

Rank these results and use the formula

$$r = 1 - \frac{6\sum d^2}{n(n^2 - 1)} \qquad (\text{with } n = 7)$$

to find *Spearman's Rank Correlation Coefficient,*

$$r = 1 - \frac{6 \times}{\times} =$$

OS 20.6 *Standardised Scores*

Two components of an assessment are shown in the table:

- a particular candidate's result
- everyone's results

Paper	*Particular Candidate*	*ALL*	
		Mean	*Standard deviation*
1	63	55	12
2	75	65	20

Use the formula to convert the candidate's score on each paper to a standardised score, using a *mean* of 50 and a *standard deviation* of 15.

Formula

$$\text{Standardised score} = 50 + \left(\frac{\text{actual mark} - \text{mean mark}}{\text{standard deviation}} \times 15 \right)$$

Paper 1

Standardised score =

Paper 2

Standardised score =

On which paper did the candidate perform better?