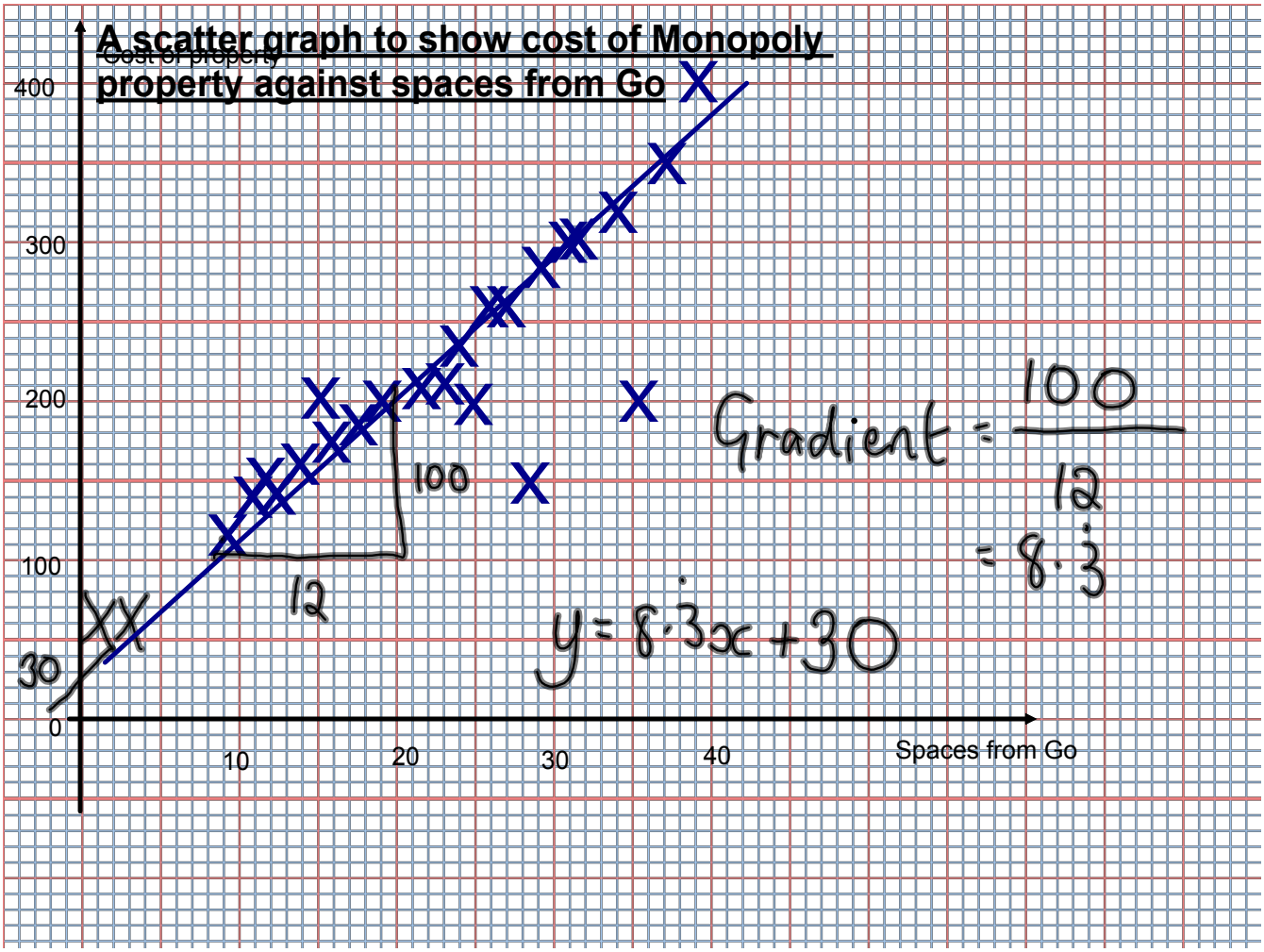
Monopoly Mayhem

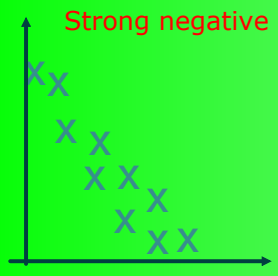
The game of Monopoly was created in 1935. Since then it has been published in 26 languages and is available in 80 countries across the world. 200 million sets have been sold and it is estimated that there is 300 billion pounds of Monopoly money in UK homes. For those of you who have never played, you move around a board with the option to purchase the property that you land on. As a property tycoon you are trying to bankrupt your fellow players and take home all the loot.

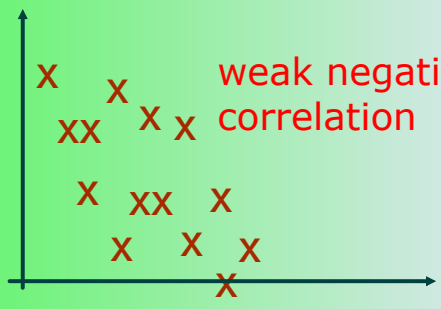
Property	Spaces from Go	Cost
Old Kent Rd	1	£60
Whitechapel Rd	3	£60
Kings Cross Station	5	£200
The Angel, Islington	6	£100
Euston Rd	8	£100
Pentonville Rd	9	£120
Pall Mall	11	£140
Electric Company	12	£150
Whitehall	13	£140
Northumberland Ave	14	£160
Marylebone Station	15	£200
Bow Street	16	£180
Marlborough St	18	£180
Vine St	19	£200
The Strand	21	£220
Fleet St	23	£220
Trafalgar Square	24	£240
Fenchurch St Station	25	£200
Leicester Square	26	£260
Coventry St	27	£260
Water Works	28	£150
Piccadilly	29	£280
Regent St	31	£300
Oxford St	32	£300
Bond St	34	£320
Liverpool St Station	35	£200
Park Lane	37	£350
Mayfair	39	£400

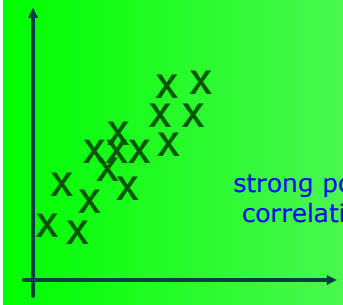
The properties vary in price. The more illustrious locations, like Park Lane, will, of course, cost you more. Looking at the table opposite, can you see a relationship between the spaces from GO and how much the property costs? One way of displaying this information is to plot a scatter graph. It clearly shows any patterns or trends in the data and helps you describe the relationship between the two variables (the things you are comparing - see the axis labels). Either plot this yourself, or use the graph ready prepared on the next page.

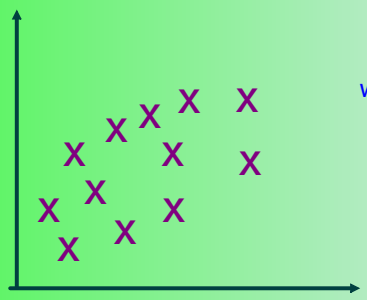

A scatter graph to show cost of Monopoly property against spaces from Go
Cost of property
400
300
200
100
30
0
10
20
30
40
Spaces from Go
100
12
Gradient = 100/12
= 8.3
y = 8.3x + 30

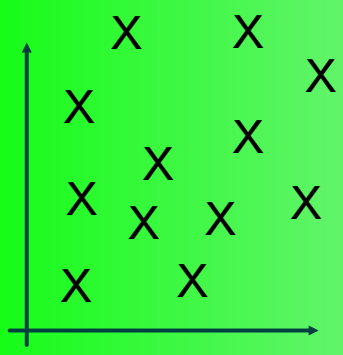
Correlation











Zero correlation

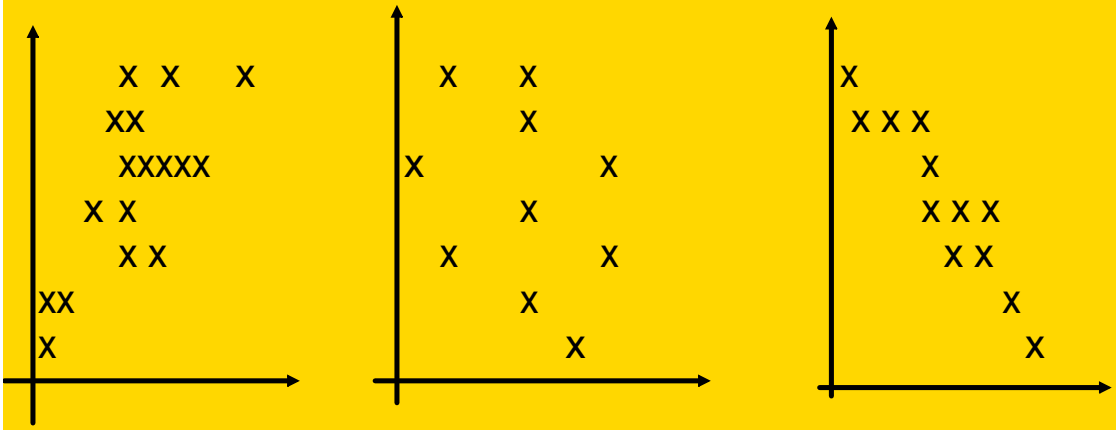
No linear correlation

page 233

page 234 C1 and C2

page 235: Find the connection

Scatter graphs



Which, if any, of these graphs match the description:

- Number of plane journeys travelled against age of traveller.
- The amount of time spent shopping and the amount of money spent
- Size of feet against number of teeth
- Temperature against distance from the equator
- Estimated grade in English against estimated grade in Maths
- Number of hours of TV watched against amount of homework done.

Lines of Best Fit

When a scatter graph has reasonably close correlation a line of best fit helps to see the general trend.

Use your ruler to cover over as many crosses as possible.

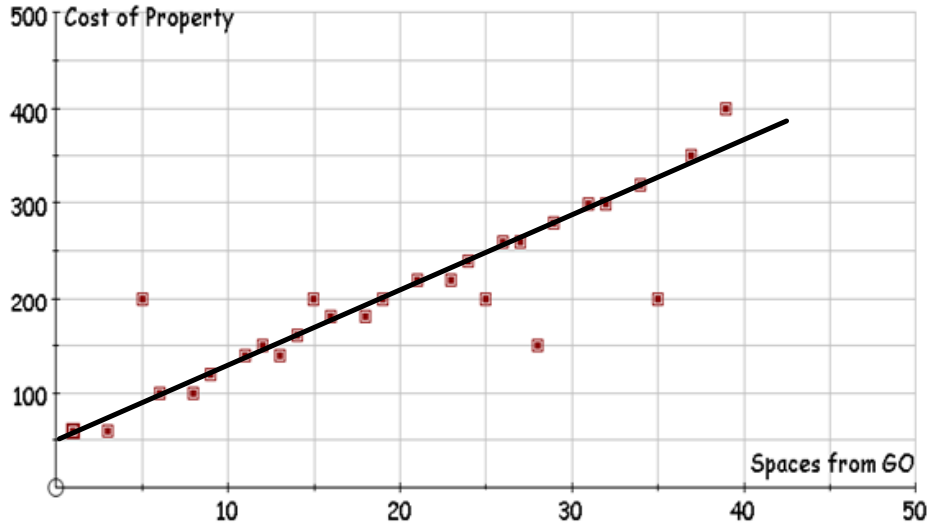
The line going down the centre of your ruler is the approx line of best fit.

If you can only cover a small percentage of the crosses there is probably no linear correlation.

Monopoly Mayhem

Draw a line of best fit on your graph.

Work out its equation.



Can you see a relationship between 'Spaces from GO' and the 'Cost' of the property? Write a sentence to describe it. Are there any points which do not seem to fit the trend? Without looking at the table can you guess which properties they are?

In order to show the trend more clearly we can draw on the graph a 'Line of Best Fit', or 'Trendline'. Draw a line on your graph (or the one above) which best fits the points. We use this line to make estimates. For example, if you put a property 22 spaces away from GO, how much do you think it should cost? Why would this only be an estimate?

All straight lines can be written in the format $y=mx+c$. This describes the relationship between the x axis variable and the y axis variable. Find out what the 'm' and 'c' mean and try to calculate the equation of your Line of Best Fit.

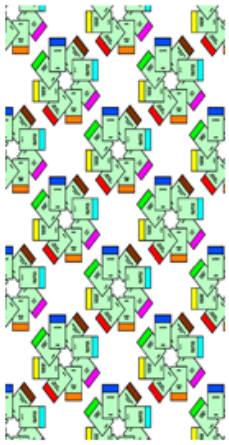
You can use this equation to help you predict what might happen. Use your equation to find out the cost of a property that is 50 spaces away from GO. Why might this not be right? What assumptions would you be making?

In Monopoly you throw two dice for your turn. On your first go, how many spaces from 'GO' are you most likely to end up? Why? The makers, Hasbro, tell us that the most landed on properties are Bow Street, Vine Street and Marlborough Street (the orange ones). Can you think why? Discuss with your class.

There are 10 tokens that represent the players on the board. Brainstorm or use this link to find out what they are:
http://www.monopoly.co.uk/index2.asp .

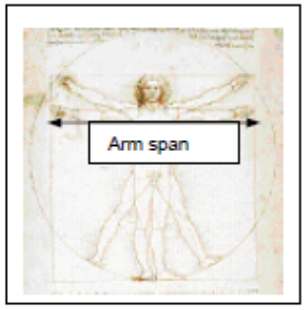
If you had first choice at the start of the game, and you picked one at random, what is the chance of you picking an animal? Would this probability be the same if you were choosing for yourself? Why?

Graph created using Autograph V 3



lent worksheet

vian theory—does it apply to you?



(1452–1519) was a scientist and an artist, one of the greatest ian Renaissance. He left only a handful of completed paintings, one a *Lisa*. He was so secretive that he wrote backwards to disguise his

drew a picture of a man standing inside a circle and a square. This is uvian Man'. It was a study of the proportions of the human body as vius, a Roman architect from the first century B.C. Based on his ropean people of his day, Leonardo believed that arm span was equal ctly proportioned body.

ne was interested in working out body proportions?

itruvian theory illustrated by Leonardo would work today?

Is the Vitruvian theory that height is equal to arm span true for British students today?

Before you begin your investigation, what answer do you predict? Why? _____

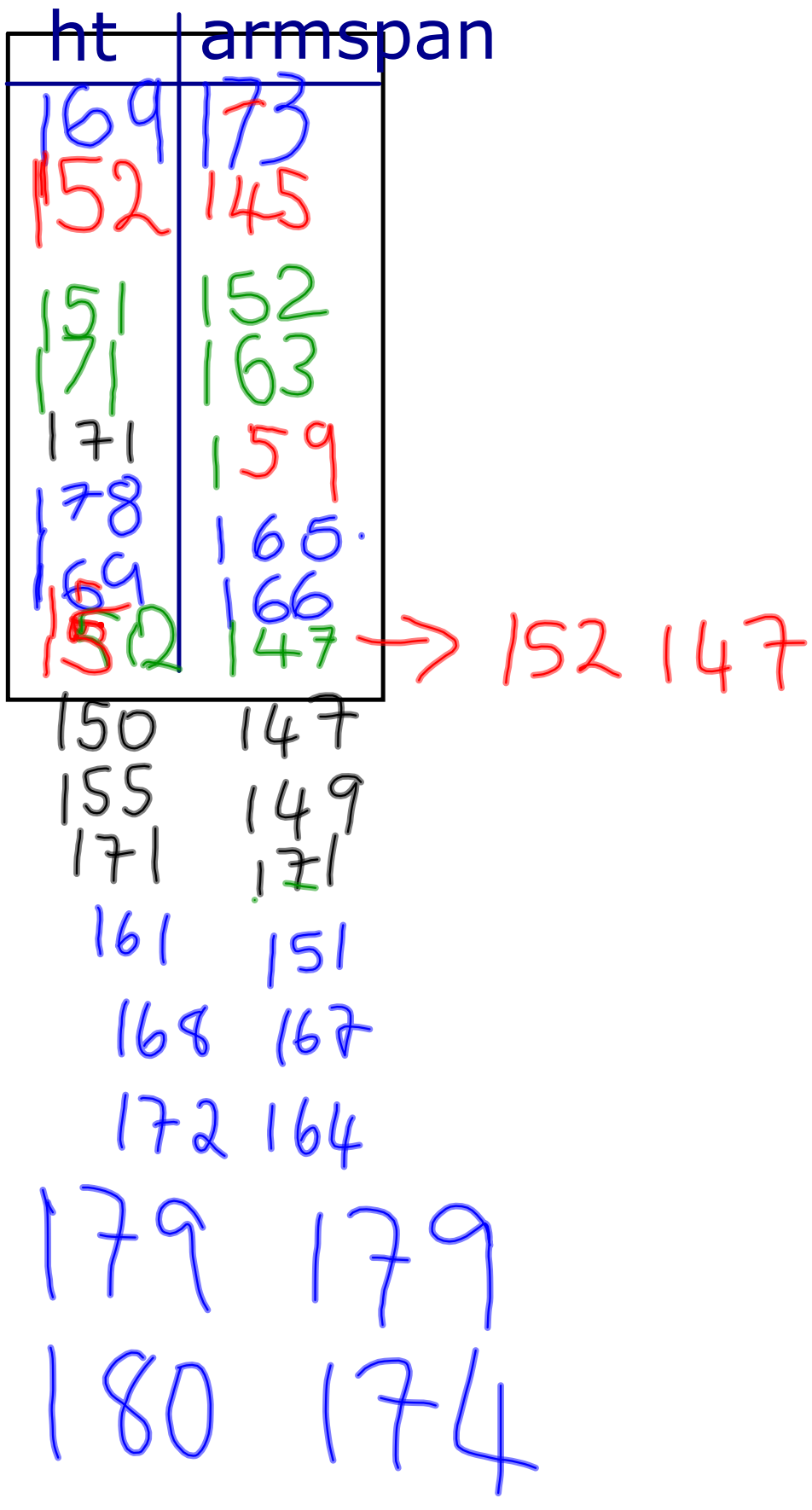
_____

Now test your prediction using data from your class.

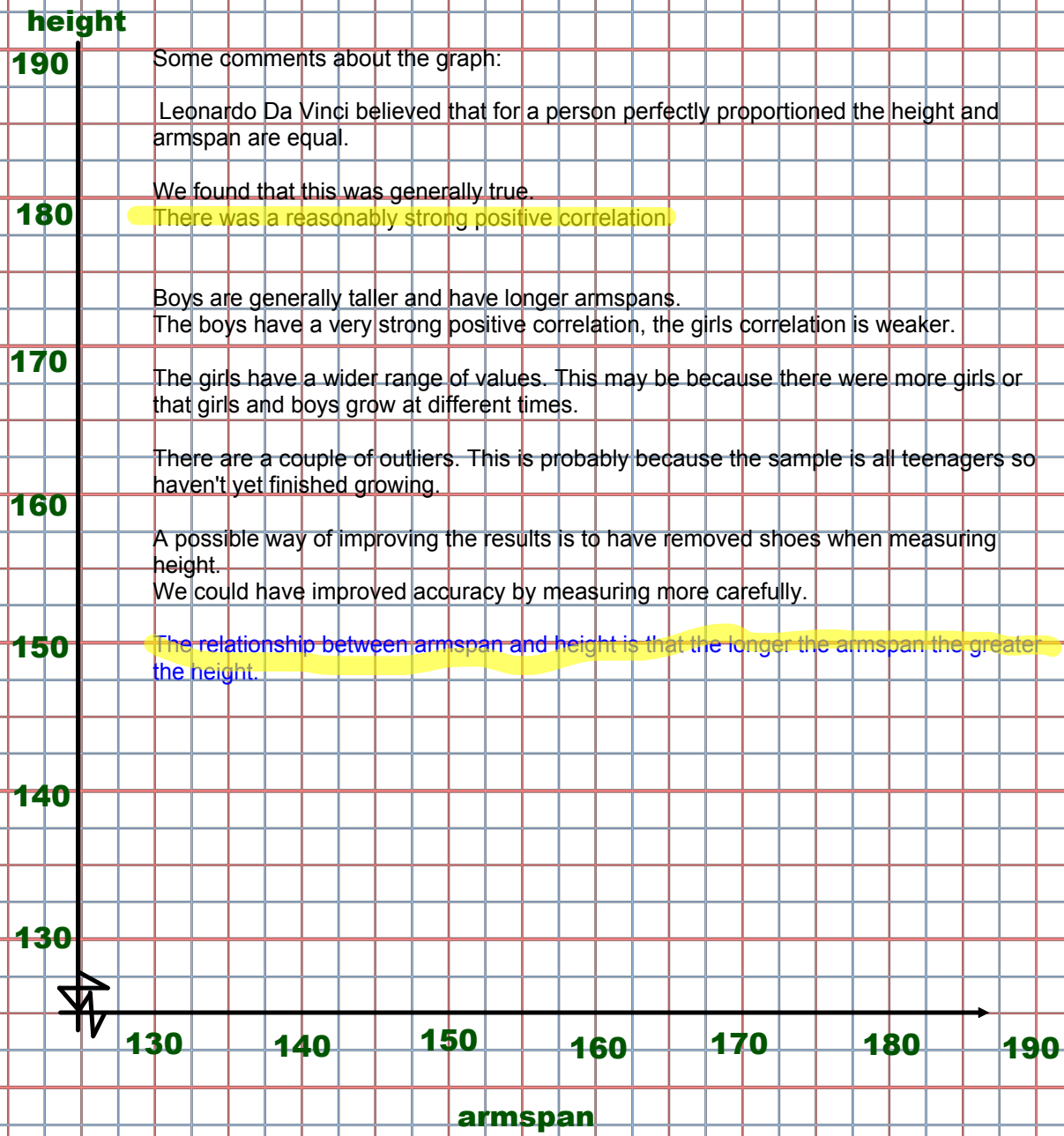
Enter the data for 10 students from your class in this table.

How will you select the students for your sample?

Girls height	Girls armspan	Boys height	Boys armspan


ht armspan
169 173
152 145
151 152
171 163
171 159
178 165
169 166
152 147
150 147
155 149
171 171
161 151
168 167
172 164
179 179
180 174

A scatter graph to show...



Some comments about the graph:

Leonardo Da Vinci believed that for a person perfectly proportioned the height and armspan are equal.

We found that this was generally true.
There was a reasonably strong positive correlation.

Boys are generally taller and have longer armspans.
The boys have a very strong positive correlation, the girls correlation is weaker.

The girls have a wider range of values. This may be because there were more girls or that girls and boys grow at different times.

There are a couple of outliers. This is probably because the sample is all teenagers so haven't yet finished growing.

A possible way of improving the results is to have removed shoes when measuring height.
We could have improved accuracy by measuring more carefully.

The relationship between armspan and height is that the longer the armspan the greater the height.

page 188 B3

Drawing your own scatter graph

1. Choose 2 columns of data
2. Put a circle around the highest piece of data for each column.
3. Make the first column the x axis (going across). Put a squiggly line if you aren't starting with zero. decide on a scale.
4. Do the same for the vertical axis.
5. Plot points.
6. Put a title.
7. Write comments about your graph.

page 339: finding the equation of the line of best

Attachments

Monopoly.pdf

waste.pdf