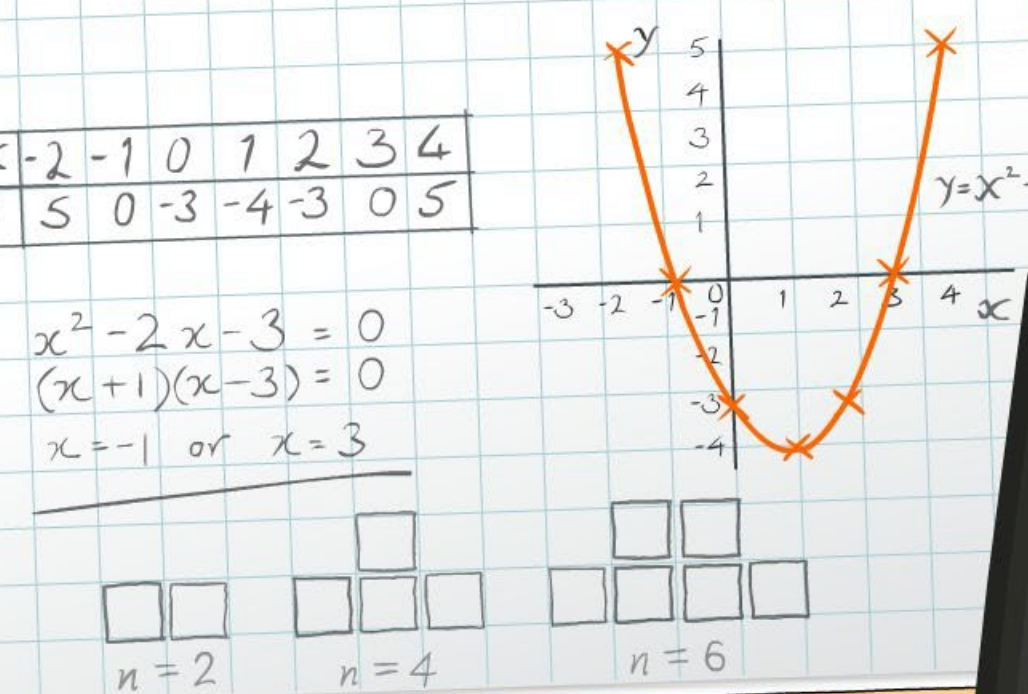
Scatter plots

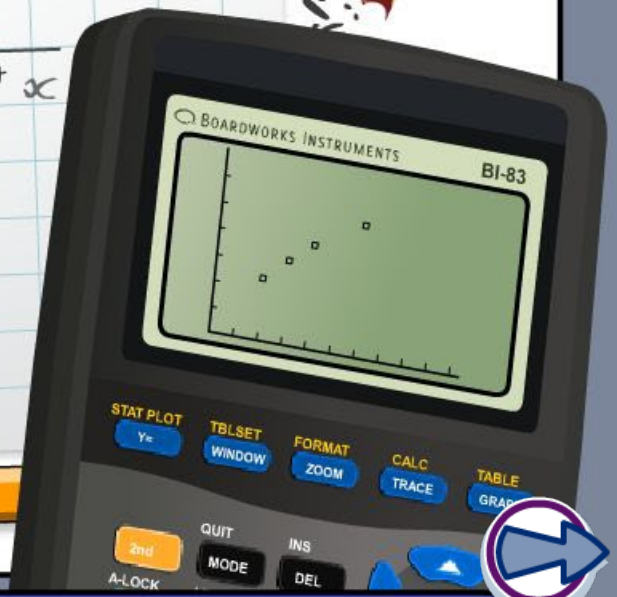
x	-2	-1	0	1	2	3	4
y	5	0	-3	-4	-3	0	5

$x^2 - 2x - 3 = 0$

$(x+1)(x-3) = 0$

$x = -1$ or $x = 3$





Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

They are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

Height and weight

Theo has done a survey of the heights and weights of twelve 9th grade boys.

Who is the tallest boy? Who is the shortest boy?

Is the tallest boy the heaviest? Is the shortest boy the lightest?

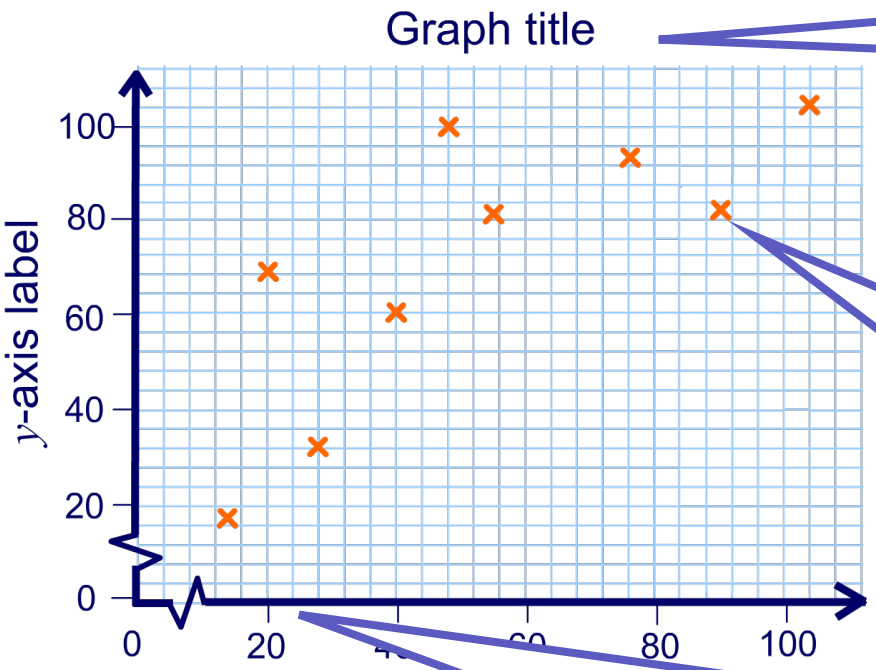
How could we graph this data?

Boy	Height (cm)	Weight (lbs)
Theo	159	115
Finley	175	119
Connor	167	115
Ben	171	119
Liam	154	108
Joshua	162	106
Aiden	181	126
Nasir	173	123
Zac	150	100
Peter	179	132
Tristan	164	119
Max	169	121

Drawing a scatter plot

A **scatter plot** can be drawn to show the relationship between two variables (i.e. a set of **bivariate** data.)

When drawing a scatter plot:



give the graph a title

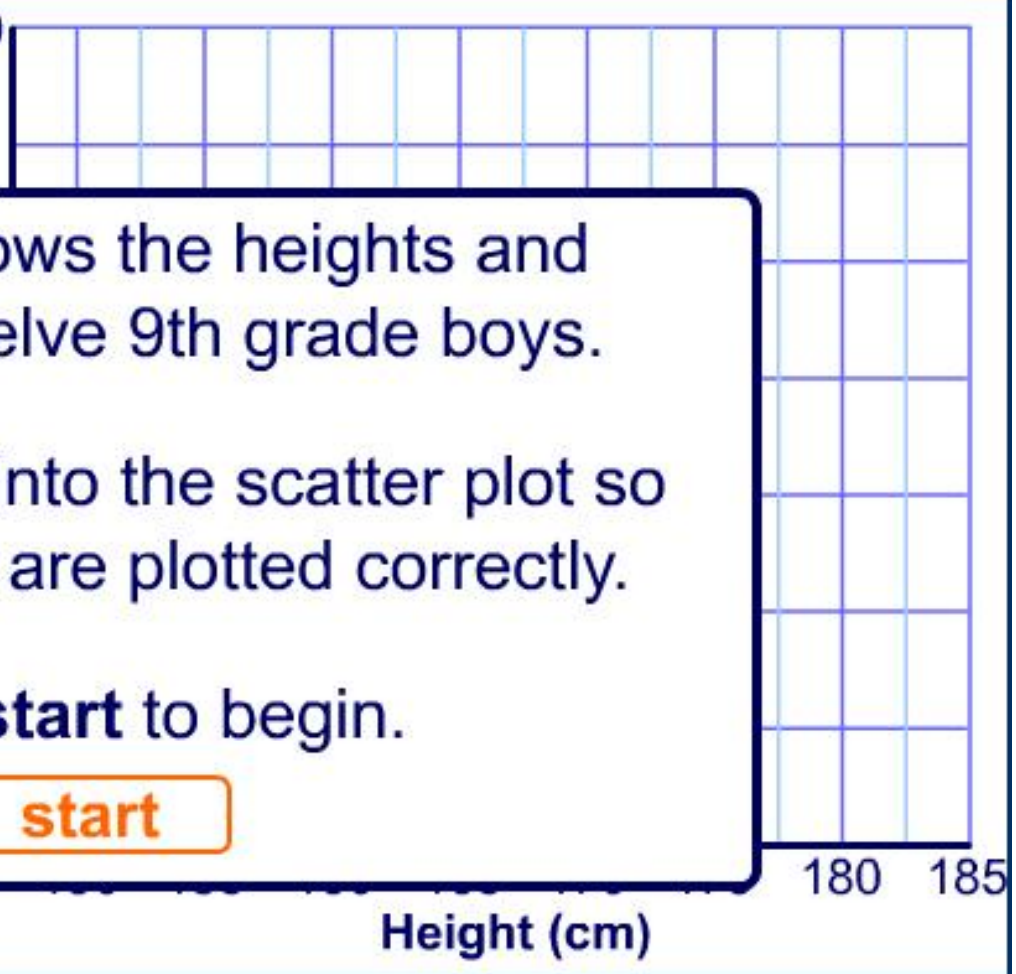
draw a small cross on the graph for each data pair

draw an x-axis and a y-axis, both with appropriate scales and labels

Plotting height and weight

MODELING

Name	Height (cm)	Weight (lbs)
Theo	159	115
Finley		
Connor		
Ben		
Liam		
Joshua		
Aiden		
Nasir		
Zac		
Peter		
Tristan		
Max		



The table shows the heights and weights of twelve 9th grade boys.

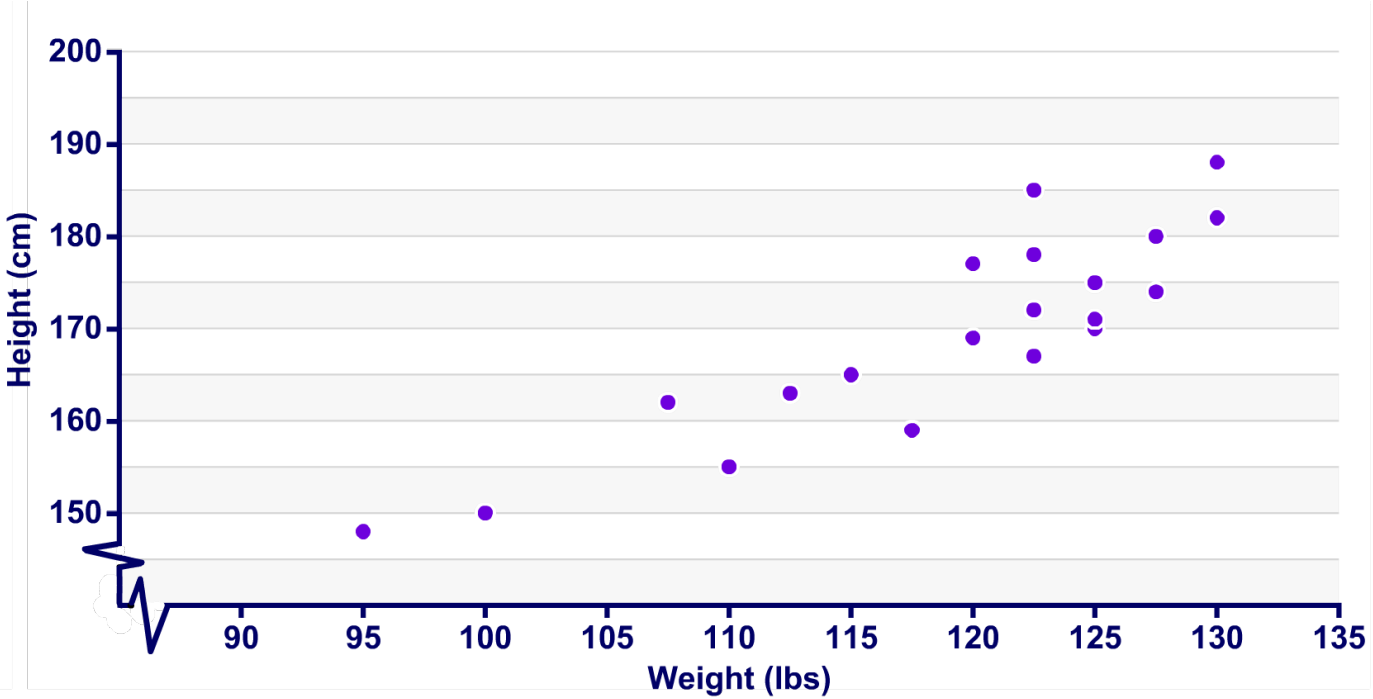
Drag the cross into the scatter plot so that the points are plotted correctly.

Press **start** to begin.

start

Interpreting scatter plots

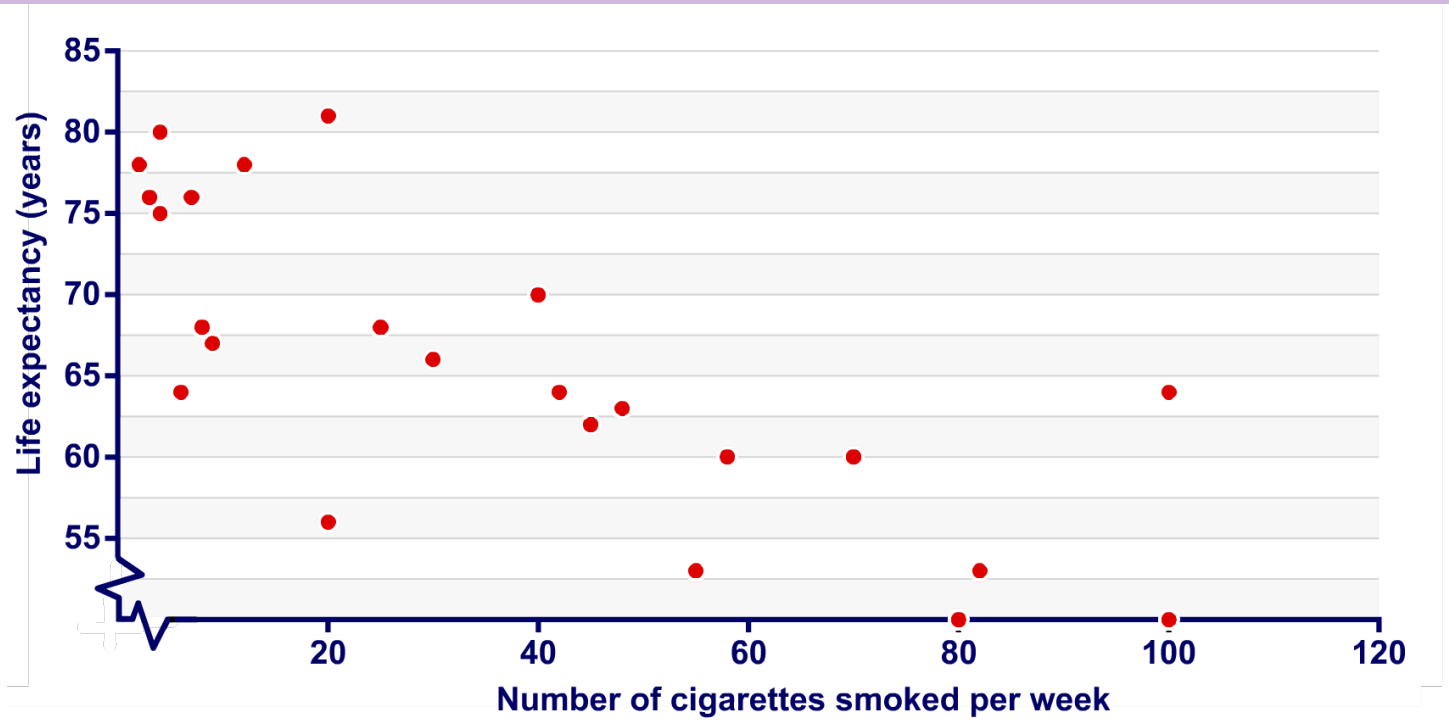
What does this scatter graph show about the relationship between the height and weight of twenty 9th grade boys?



In general, as weight increases, height also increases. This is called a **positive correlation**.

Interpreting scatter plots

What does this scatter plot show about the relationship between life expectancy and cigarettes smoked?

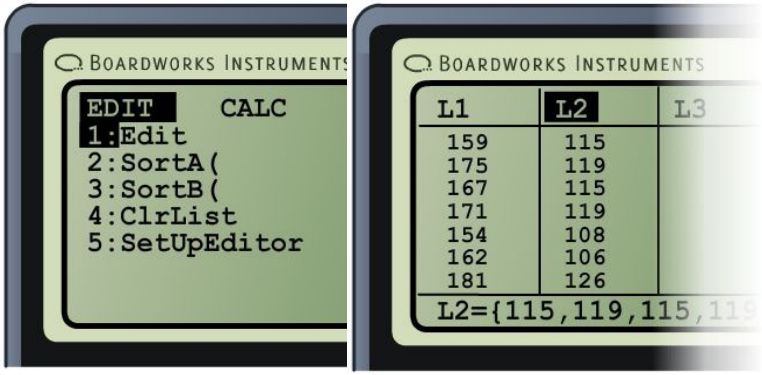


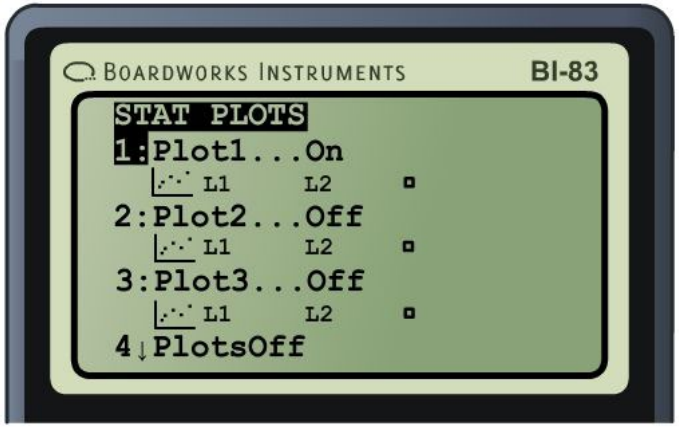
It shows that as the number of cigarettes smoked increases, life expectancy decreases. This is a **negative correlation**.

Using a graphing calculator

You can use your graphing calculator to make a scatter plot of a set of paired data.

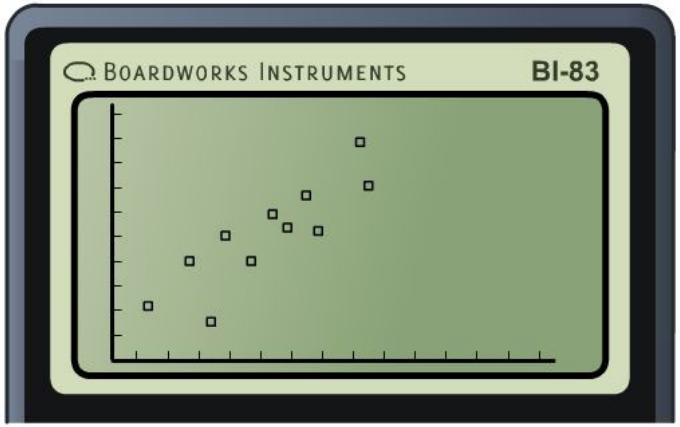
Press “STAT” then select “Edit” to enter your two data sets.





Use the “STAT PLOT” feature to select the type of graph and the lists you want to use. Turn Plot1 “On”.

Press “GRAPH” to plot the data.



Correlation

Scatter plots can show a relationship between two variables.

This relationship is called **correlation**.

- Correlation is a general **trend**.
- Some data items, the **outliers**, will not fit this trend.
- Correlation can be weak or strong.

Scatter plots can show:

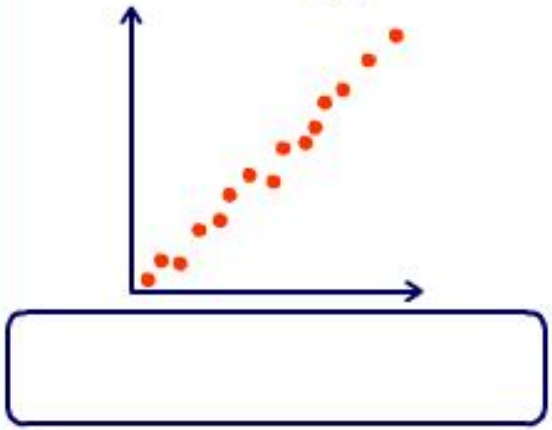
positive correlation: as one variable increases, so does the other variable

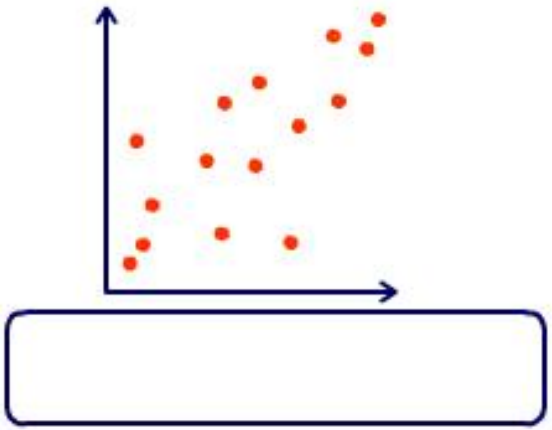
negative correlation: as one variable increases, the other variable decreases

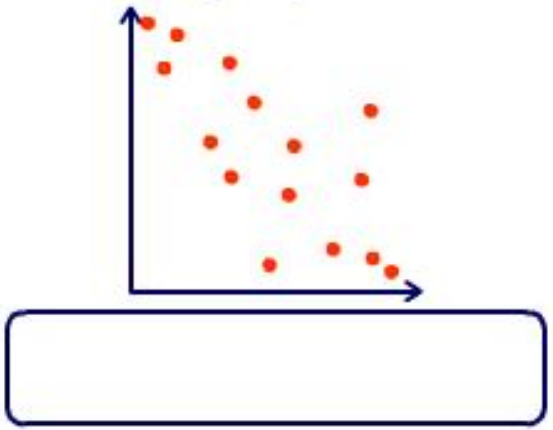
zero correlation: no linear relationship between the variables

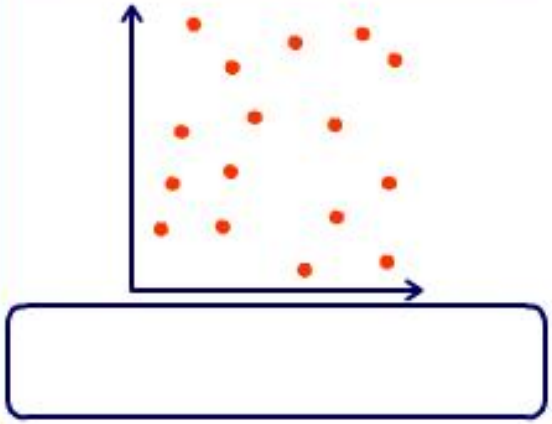
Correlation from scatter plots

What type of correlation is shown in these graphs?









weak positive