

4-5 Scatter Plots

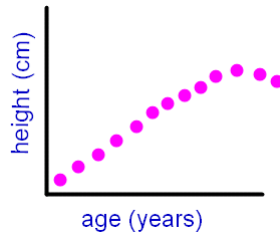
Warm-up

Describe the translation of the point (x, y)

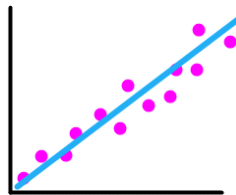
1. 3 units left
2. 5 units up, 4 units right
3. Describe the translation $(2, -9) \rightarrow (5, -7)$

4-2 Scatter Plots

A **scatter plot** shows the relationship between two data sets.



Fitted line: A straight line drawn on a scatter plot that passes close to most of the points. Helps to make predictions. The stronger the correlation, the more accurate the prediction.



Example 1: The table shows the average height and weight for boys 1 to 10 years of age.

Age	1	2	3	4	5	6	7	8	9	10
Height (in)	17	23	36	39	42	45	47	50	52	54
Weight (lb)	21	26	31	34	39	36	51	57	63	67

What average weight could be predicted for a both that is 60in. tall?

Solution: Create a scatter plot to show relationship between height and weight. Draw a fitted line b/t the points.

Draw a dashed line from 60 in. up to the fitted line.

Then draw a line to the left to determine the weight.

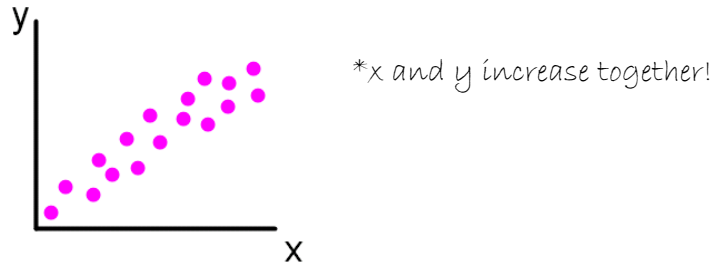
The boy will be about 70 lbs.



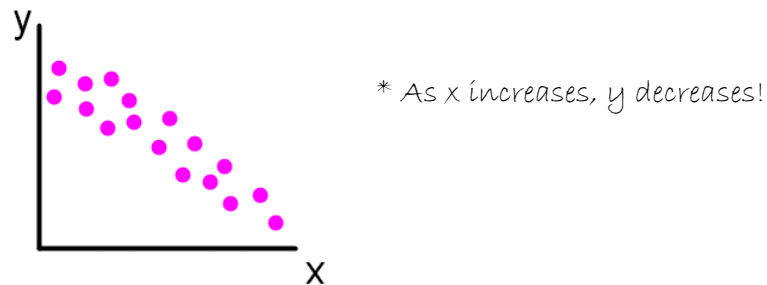
Correlation

Scatter plots show relationships...

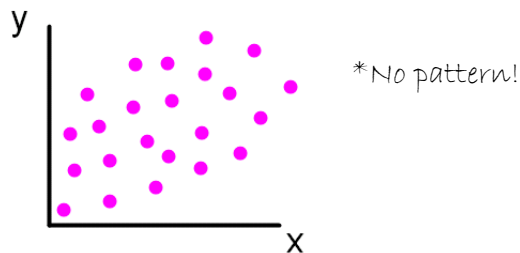
Positive Correlation: When two data sets increase together. In example 1, as the height increased, the weight increased. This is called a positive correlation.



Negative Correlation: When one data set decreases as the other data set increases.



No Correlation: Sometimes data sets show no correlation.



A **fitted line** shows if the correlation between two data sets is strong or weak.

If data points are:

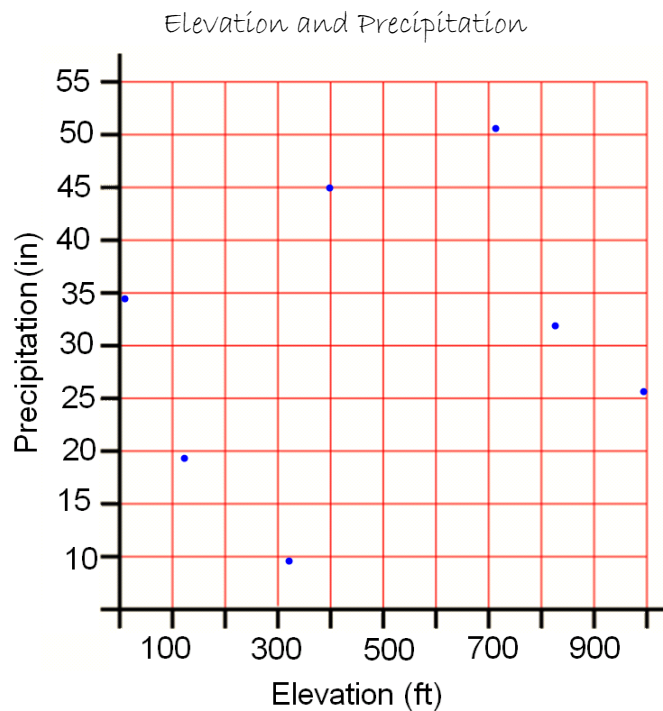
- **close** to a fitted line mean there is a **strong correlation**.
- **far** from the fitted line means there is a **weak correlation**.

The stronger the correlation, the better your predictions will be.

Example 2: Make a scatter plot of the elevation and precipitation. State whether it shows a positive, negative, or no correlation.

City	Elevation (ft)	Precipitation (in)
Anchorage	114	19
Buffalo	705	51
Seattle	400	45
Omaha	997	26
Fresno	328	9
Tampa	19	34
Minneapolis	834	33

Solution:



No correlation because the data points show no pattern.

Watch Out

A correlation between two sets of data does not necessarily mean there is a cause-and-effect relationship.

Example 3: Suppose there is a positive correlation between the number of students that attend our home football game and the number of games won. What conclusions can you make?

Solution: Some conclusions...

- Strong support from fans caused the team to win
- The team's success caused more people to attend
- Maybe there is no connection
- Another factor is influencing the team's success

Summary

- A scatter plot is a graph that relates data from two different sets.
- Fitted line is used to make predictions.
 - Rises quickly from left to right is called a positive correlation.
 - Falls down from left to right is called a negative correlation.
- Strong positive and negative correlations have data points very close to the line of best fit.
- Weak positive and negative correlations have data points that are not clustered near or on the line of best fit.
- Data points that are not close to the line of best fit are called outliers.

Graphing reminders

- Clearly show/mark
 - Title of graph
 - x- and y-axis
 - Scales for the x- and y-axis
- All points must be plotted on the graph
- Use a shadow box for each additional point to show two or more points that are the same.
- Can use a squiggle to show a break in the x- or y-values.

