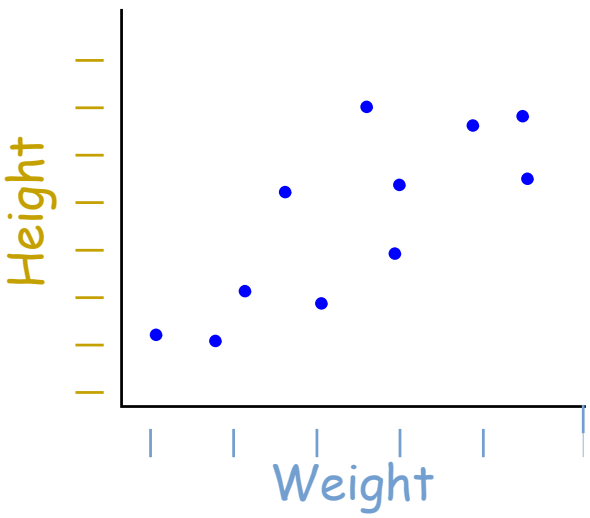
# Scatter Plots




A Scatter (XY) Plot has points that show the relationship between two sets of data.

In this example, each dot shows one person's weight versus their height.

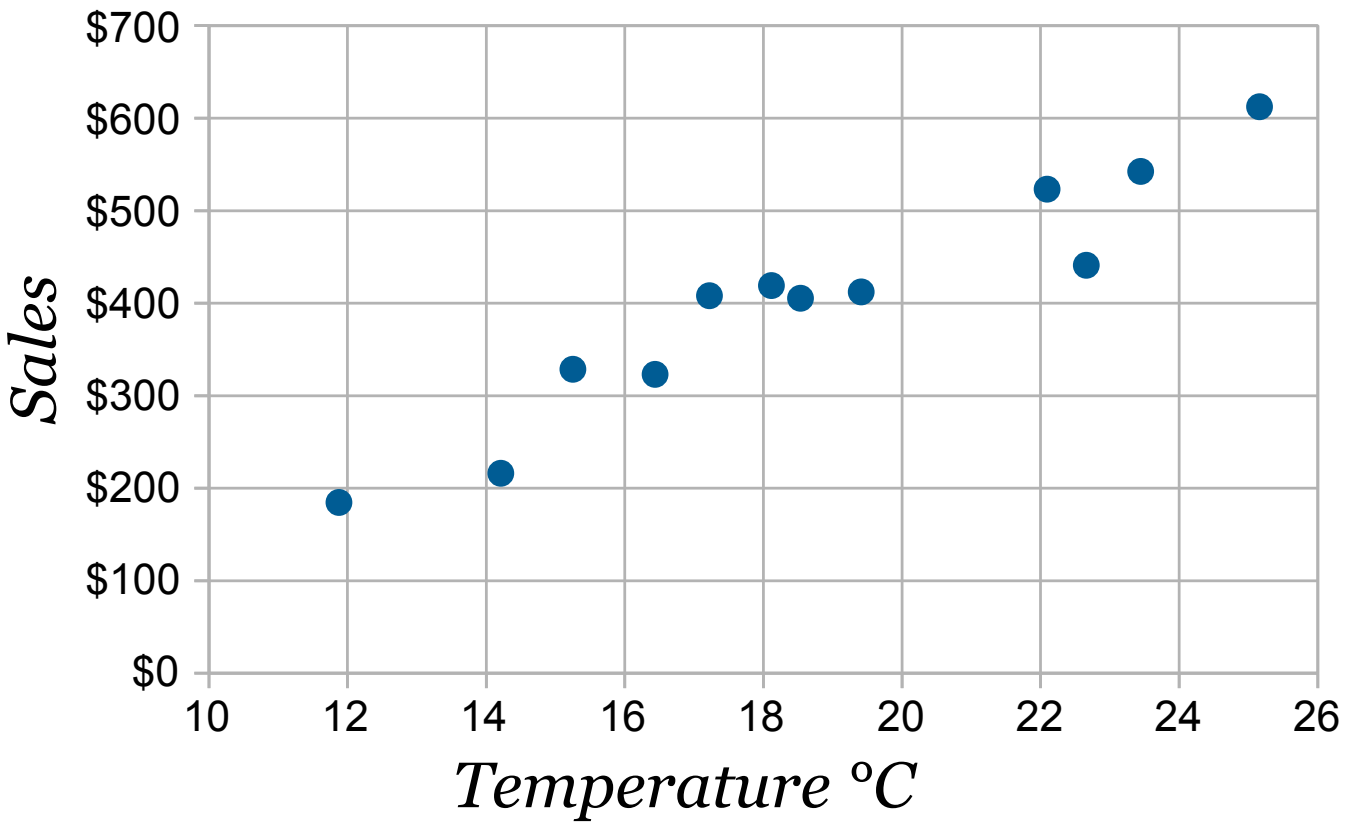
(The data are plotted on the graph as "Cartesian (x,y) Coordinates")

## Example:

The local ice cream shop keeps track of how much ice cream they sell versus the noon temperature on that day. Here are their figures for the last 12 days:

| *Ice Cream Sales vs Temperature* | |
|---|---|
| **Temperature °C** | **Ice Cream Sales** |
| 14.2° | $215 |
| 16.4° | $325 |
| 11.9° | $185 |
| 15.2° | $332 |
| 18.5° | $406 |
| 22.1° | $522 |
| 19.4° | $412 |
| 25.1° | $614 |
| 23.4° | $544 |
| 18.1° | $421 |
| 22.6° | $445 |
| 17.2° | $408 |

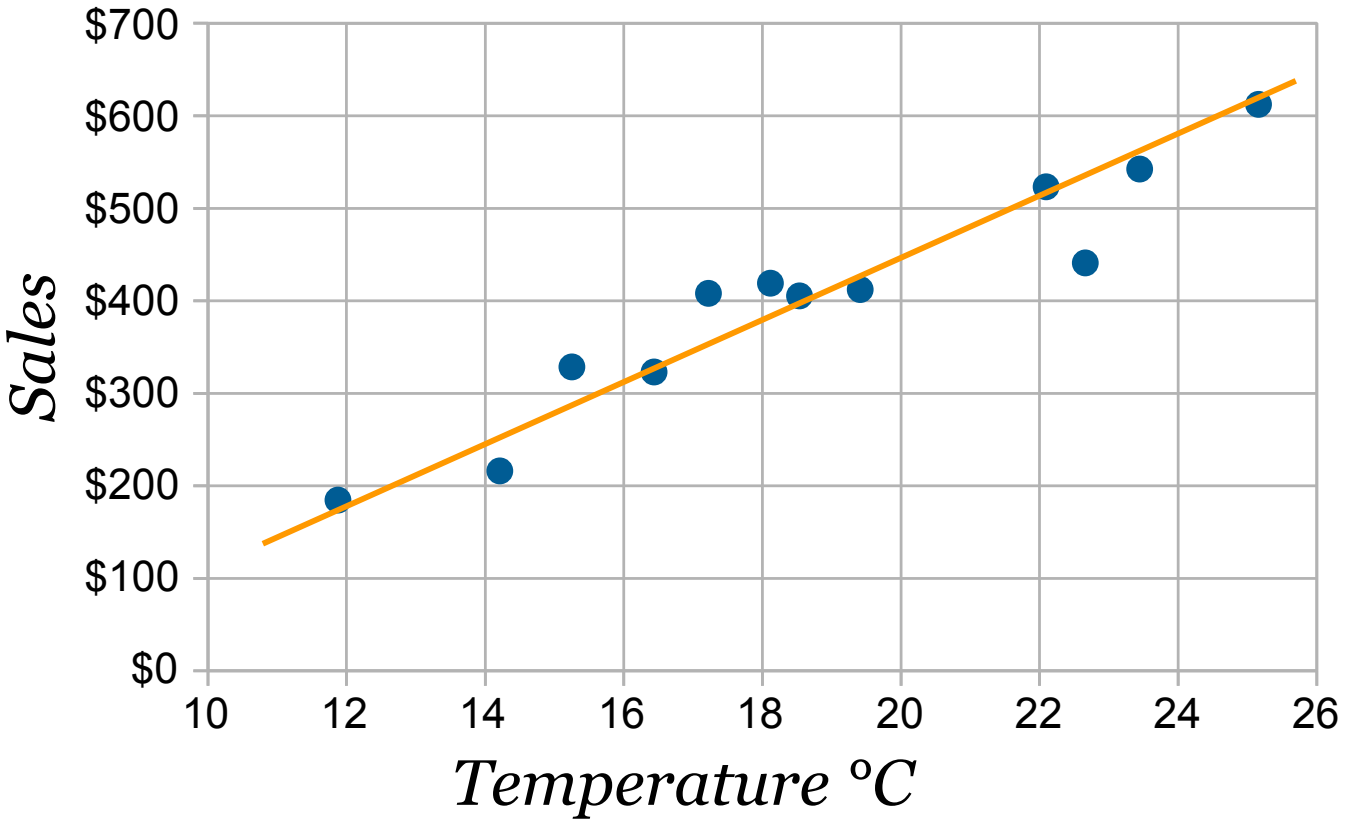
And here is the same data as a Scatter Plot:




It is now easy to see that **warmer weather leads to more sales**, but the relationship is not perfect.

## Line of Best Fit

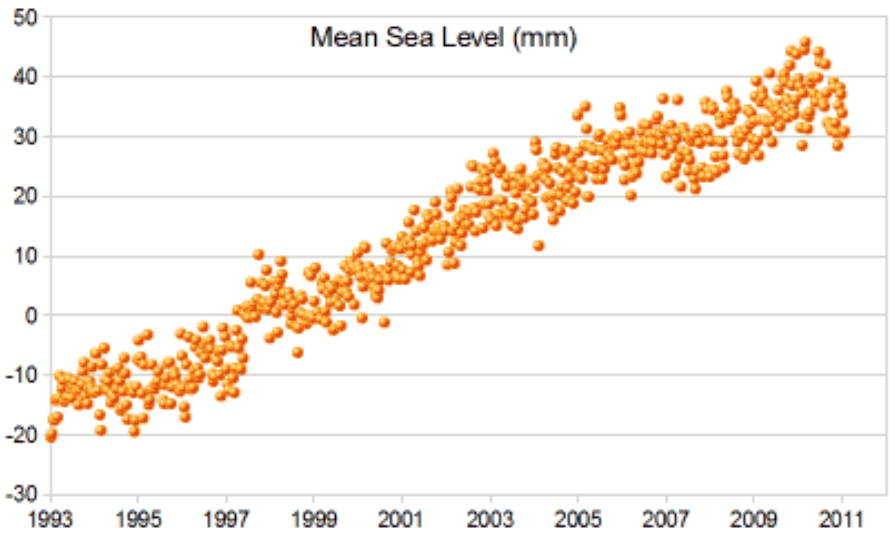
We can also draw a "Line of Best Fit" (also called a "Trend Line") on our scatter plot:

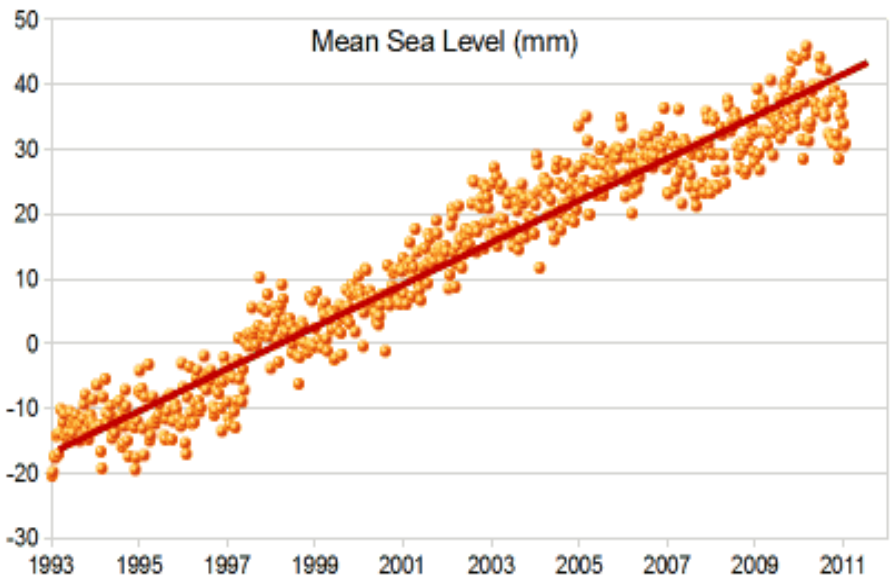



Try to have the line **as close as possible to all points** and as many points above the line as below.

But for better accuracy we can calculate the line using Least Squares Regression.

# Example: Sea Level Rise

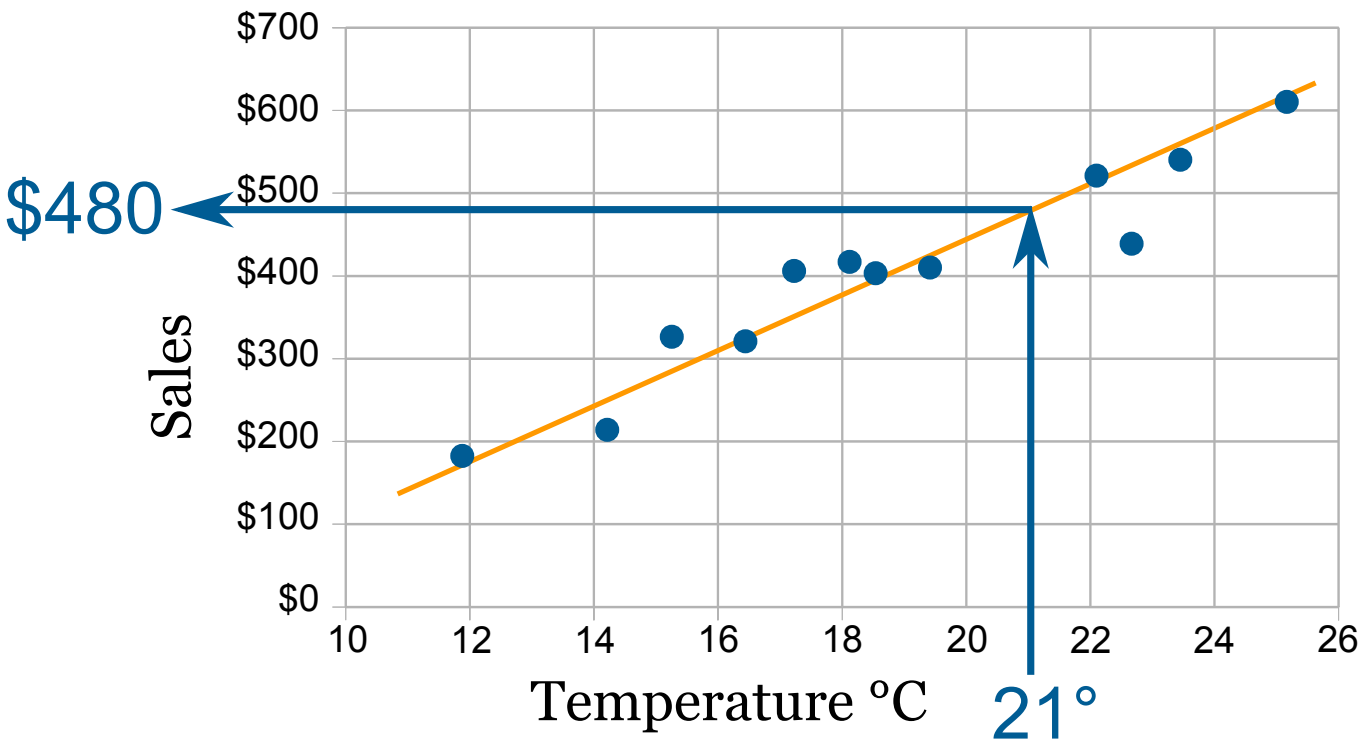
| | |
|---|---|
| A Scatter Plot of Sea Level Rise by Year |  |

| | |
|---|---|
| Scatter Plot of Sea Level Rise by Year |  |



# Interpolation and Extrapolation

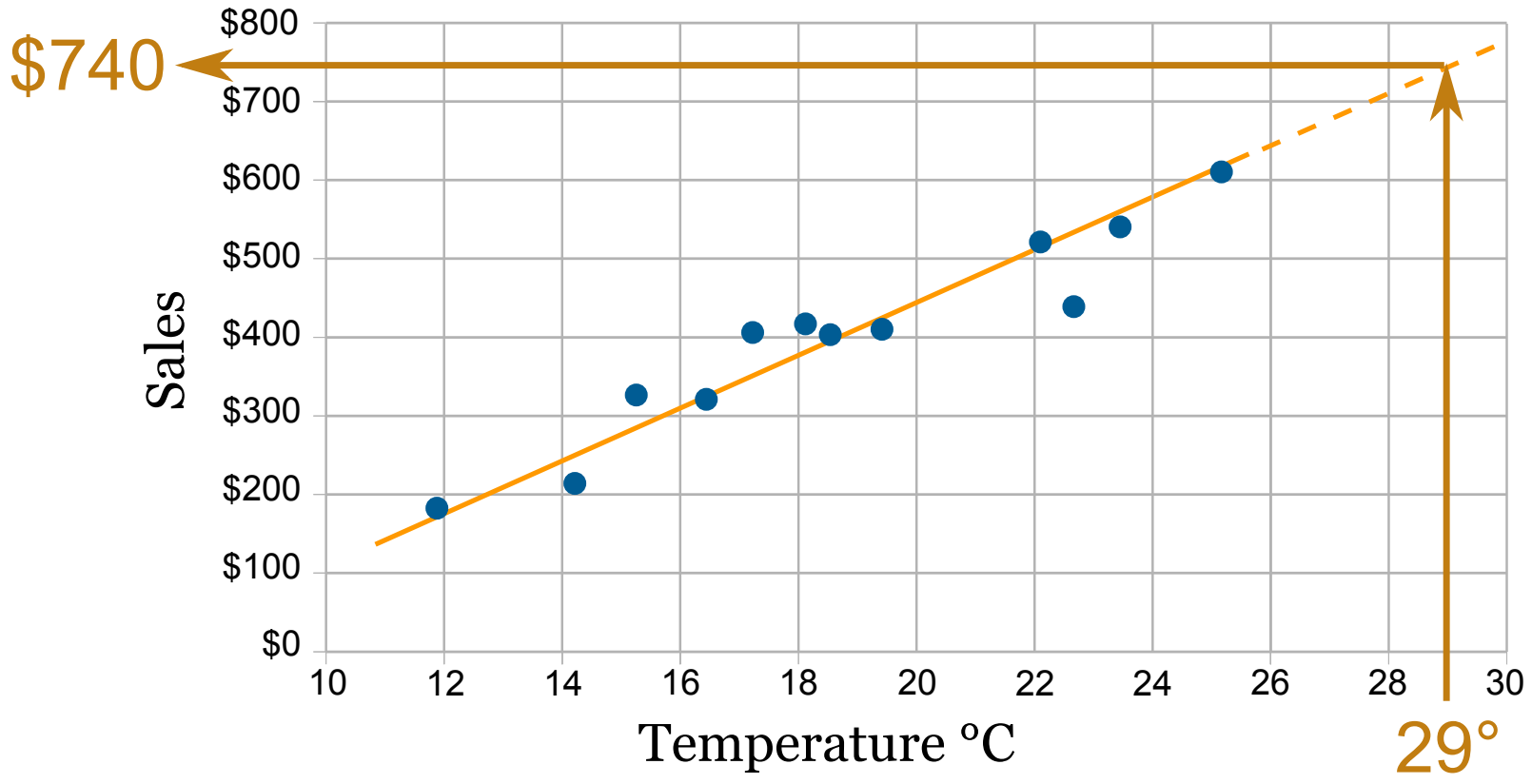
**Interpolation** is where we find a value **inside** our set of data points.





Here we use **linear interpolation** to estimate the sales at 21 °C.

**Extrapolation** is where we find a value **outside** our set of data points.




Here we use **linear extrapolation** to estimate the sales at 29 °C (which is higher than any value we have).

Careful: **Extrapolation** can give misleading results because we are in "uncharted territory".