The parameters in the linear regression equation target\_variable = intercept + constant \* feature\_variable have specific names in both mathematics and machine learning.

Here's a breakdown of the terminology for each parameter:

### 1. The 'constant' Multiplying the Feature Variable

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Term(s)** | **Mathematical Notation** | **Description** |
| **Mathematics** | Slope, Gradient | m | It represents the steepness of the line, indicating how much the target variable changes for a one-unit change in the feature variable. |
| **Machine Learning** | **Coefficient**, **Weight** | β1​, w1​, θ1​ | This value is "learned" during the model training process. It quantifies the strength and direction of the relationship between a feature and the target. A positive weight means a positive correlation, and a negative weight means a negative correlation. |

### 2. The 'intercept'

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Term(s)** | **Mathematical Notation** | **Description** |
| **Mathematics** | y-intercept | c, b | It is the point where the line crosses the vertical y-axis. Mathematically, it's the value of the target variable when the feature variable is zero. |
| **Machine Learning** | **Intercept**, **Bias** | β0​, w0​, θ0​ | This is also a parameter that is learned during training. It represents the baseline value of the target variable when all feature variables are zero. The term "bias" is used because it provides a constant offset to the predictions. |

### Summary in Equation Form

**Traditional Mathematical Form:**

The equation for a straight line is commonly written as:

y=mx+c

Where:

* y is the dependent variable.
* x is the independent variable.
* m is the **slope**.
* c is the **y-intercept**.

**Machine Learning Form:**

In a machine learning context, the same equation for a simple linear regression model is often expressed as:

y^​=β0​+β1​x1​

or

hθ​(x)=θ0​+θ1​x1​

or

y′=b+w1​x1​

Where:

* y^​ (or hθ​(x) or y′) is the predicted value of the target variable.
* x1​ is the feature variable.
* β0​ (or θ0​ or b) is the **intercept** or **bias**.
* β1​ (or θ1​ or w1​) is the **coefficient** or **weight** for the feature x1​.