**Precision and Recall**

Let’s say the pile has 15 animals:

* 10 Cats
* 5 Dogs

Now, you picked 8 animals from the pile:

* 6 are Cats (Correct selections – "True Positives")
* 2 are Dogs (Mistakes – "False Positives")
* There are still 4 Cats left in the pile (Missed – "False Negatives").

#### **Precision:**

* Out of the 8 animals you picked, 6 are actually cats, so **Precision = 6/8 = 75%**.

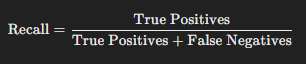
#### **Recall:**

* Out of the total 10 cats in the pile, you found 6, so **Recall = 6/10 = 60%**.

### **Precision:**

* **Definition**: Precision is the proportion of **correctly identified positive results** (True Positives) out of **all the results we labeled as positive**.   
    
  **Formula**:  
  

### **2. Recall:**

* **Definition**: Recall is the proportion of **correctly identified positive results** (True Positives) out of **all actual positives** in the dataset.
* **Formula**:  
  

### **Example:**

Let's say we’re trying to classify whether emails are **spam** (positive) or **not spam** (negative). We have a dataset of 20 emails:

* 12 are actually spam (positive cases).
* 8 are not spam (negative cases).

We build a classifier and make the following predictions:

* You predicted that 10 emails are spam.
  + **8 of them are actually spam** (True Positives).
  + **2 of them are not spam** (False Positives).
* We missed **4 spam emails** (False Negatives).

Now, let's calculate **precision** and **recall**:

#### **Precision:**

* Precision focuses on **what you predicted as spam** (positive) and how many of those predictions were actually correct.



* So, your **precision** is **80%**, meaning that **80% of the emails you predicted as spam were actually spam**.

#### **Recall:**

* Recall focuses on **all the actual spam emails** and measures how many of those you correctly identified.



* So, your **recall** is **66.67%**, meaning that **you correctly identified about 67% of all the actual spam emails**.