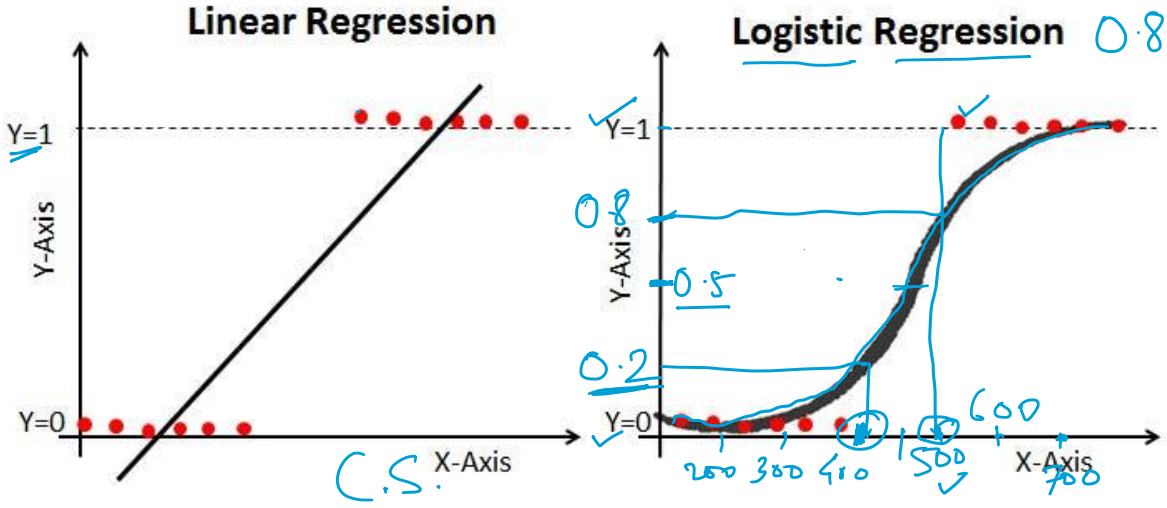

Linear Regression
Y=1
Y-Axis
Y=0
X-Axis
Logistic Regression
0.8
Y=1
0.8
Y-Axis
0.5
0.2
Y=0
X-Axis
600
700
200
300
400
500

Confusion Matrix

	Predicted Positive	Predicted Negative
Actual Positive	True Positive (TP)	False Negative (FN)
Actual Negative	False Positive (FP)	True Negative (TN)

Confusion Matrix for loan approval -100 rows

Scenario

Positive Class (1): Loan Approved

Negative Class (0): Loan Not Approved

Assuming:

- True Positives (TP): 50
- True Negatives (TN): 40
- False Positives (FP): 5
- False Negatives (FN): 5

Binary - 2 outputs

	Predicted Positive	Predicted Negative
Actual Positive	TP - 50	FN – 5
Actual Negative	FP - 5	TN – 40

Accuracy: The proportion of the total number of predictions that were correct.

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

Confusion Matrix for Disease Prediction

Scenario

Positive Class (1): Disease Detected

Negative Class (0): No Disease

Confusion Matrix

Assuming:

True Positives (TP): 30

True Negatives (TN): 50

False Positives (FP): 15

False Negatives (FN): 5

	Predicted Positive	Predicted Negative
Actual Positive	TP - 30	FN – 5
Actual Negative	FP - 15	TN – 50

Recall (Sensitivity or True Positive Rate): The proportion of actual positives that were correctly identified.

$$\text{Recall} = \frac{TP}{TP + FN}$$

Confusion matrix for spam/non-spam email classification

Consider a dataset where we have 100 instances, and we use a classification model to predict whether an email is spam (positive) or not spam (negative)

Assume

TP = 40 (40 spam emails correctly classified as spam)

FN = 10 (10 spam emails incorrectly classified as not spam)

FP = 5 (5 not spam emails incorrectly classified as spam)

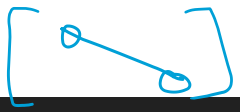
TN = 45 (45 not spam emails correctly classified as not spam)

Spam → inbox

	Predicted Positive	Predicted Negative
Actual Positive	TP - 40	FN – 10
Actual Negative	FP - 5	TN – 45

Precision (Positive Predictive Value): The proportion of positive predictions that were actually correct.

$$\text{Precision} = \frac{TP}{TP + FP} \qquad \frac{40}{40+5} = \frac{40}{45}$$



F1 Score: The harmonic mean of precision and recall.

$$\text{F1 Score} = 2 \times \frac{\text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$

→ acc. C.M. Re, Pre, F1