

# Linear Regression

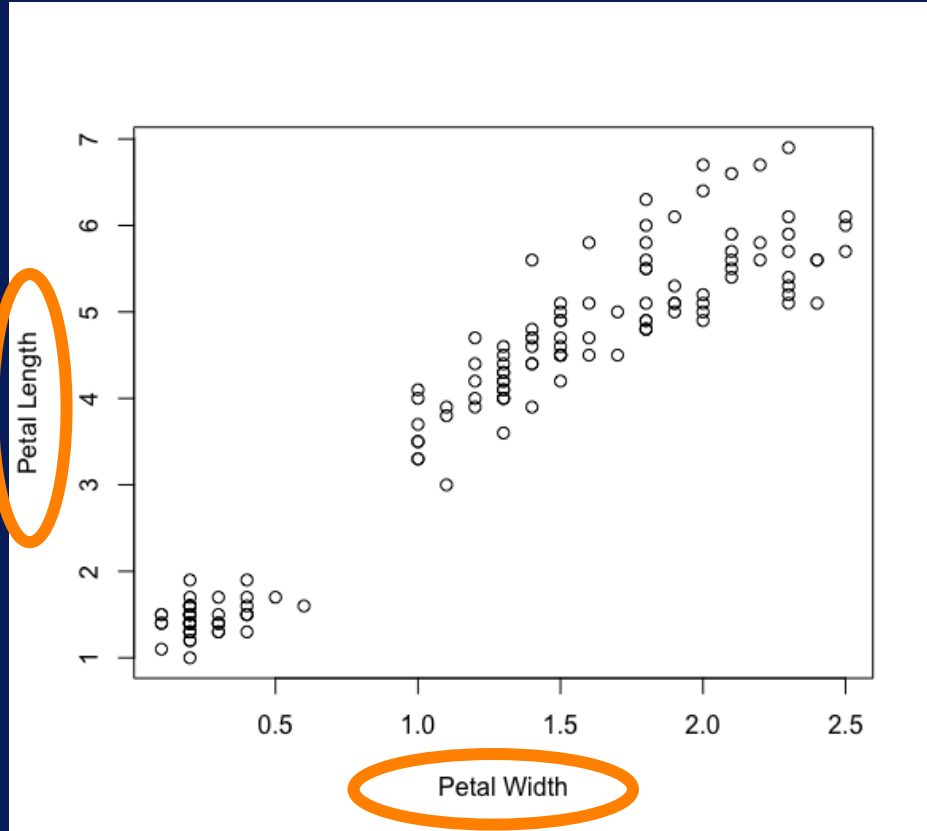
# After this video you will be able to..

- Describe how linear regression works
- Discuss how least squares is used in linear regression
- Define simple and multiple linear regression

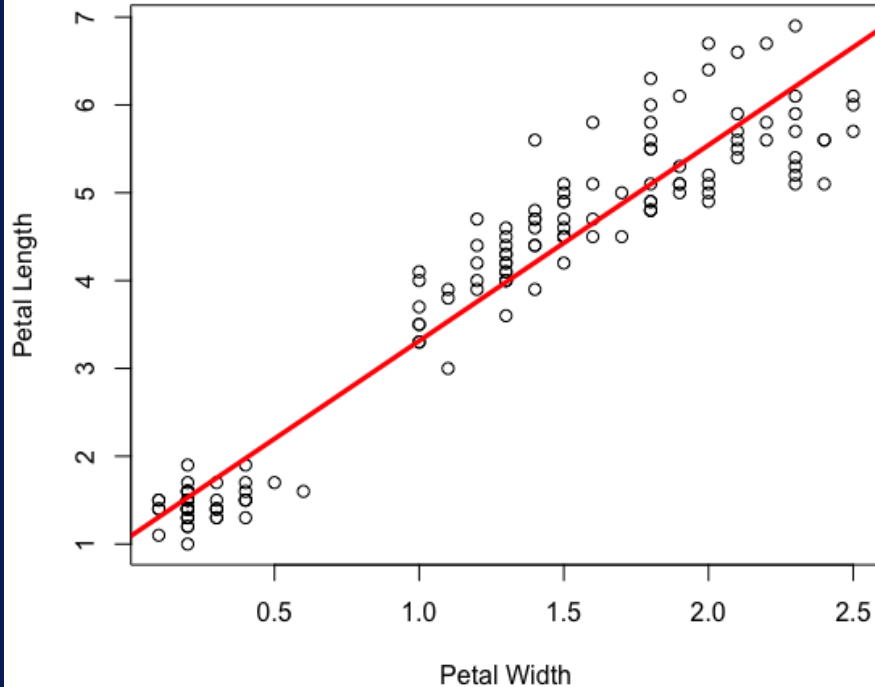
# Linear Regression

- Captures relationship between numerical output and input variables
- Relationship is modeled as linear

# Linear Regression Model



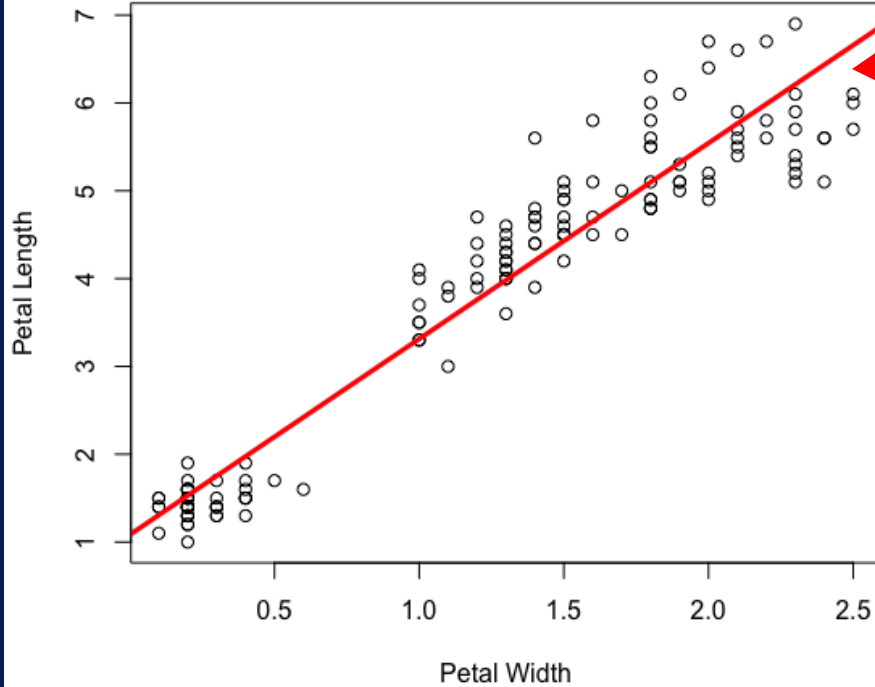
# Linear Regression Model



## Regression Task:

Given petal width, predict petal length.

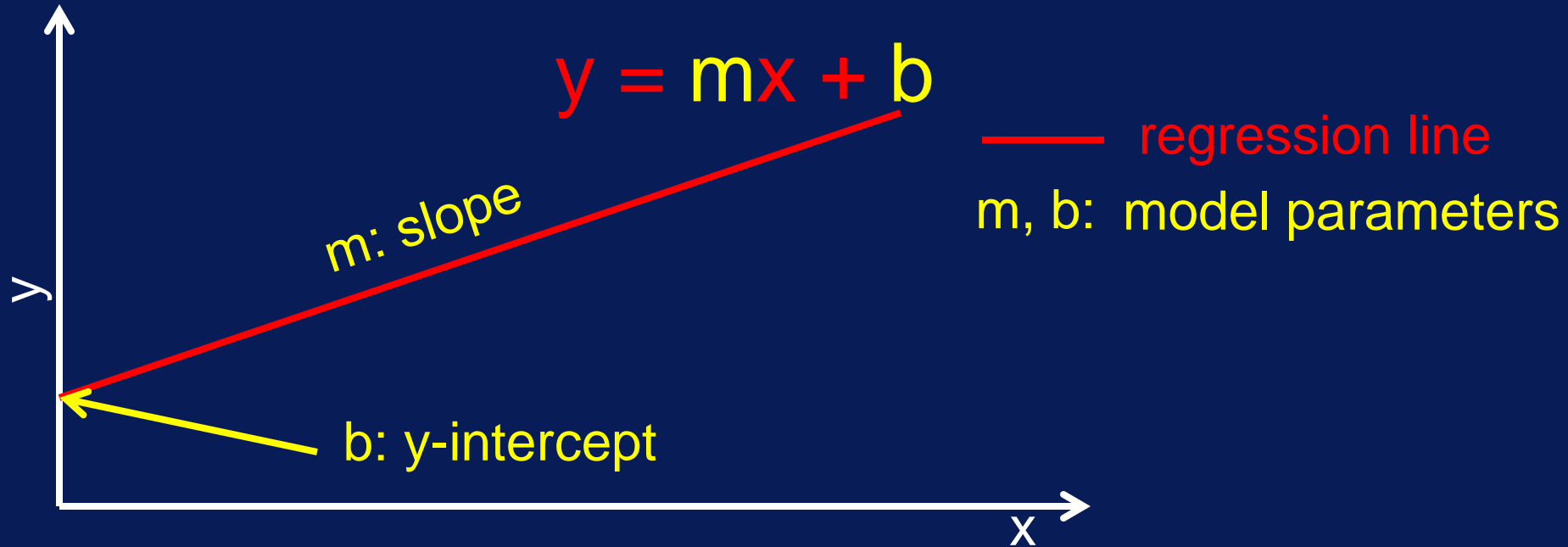
# Linear Regression Model



regression line

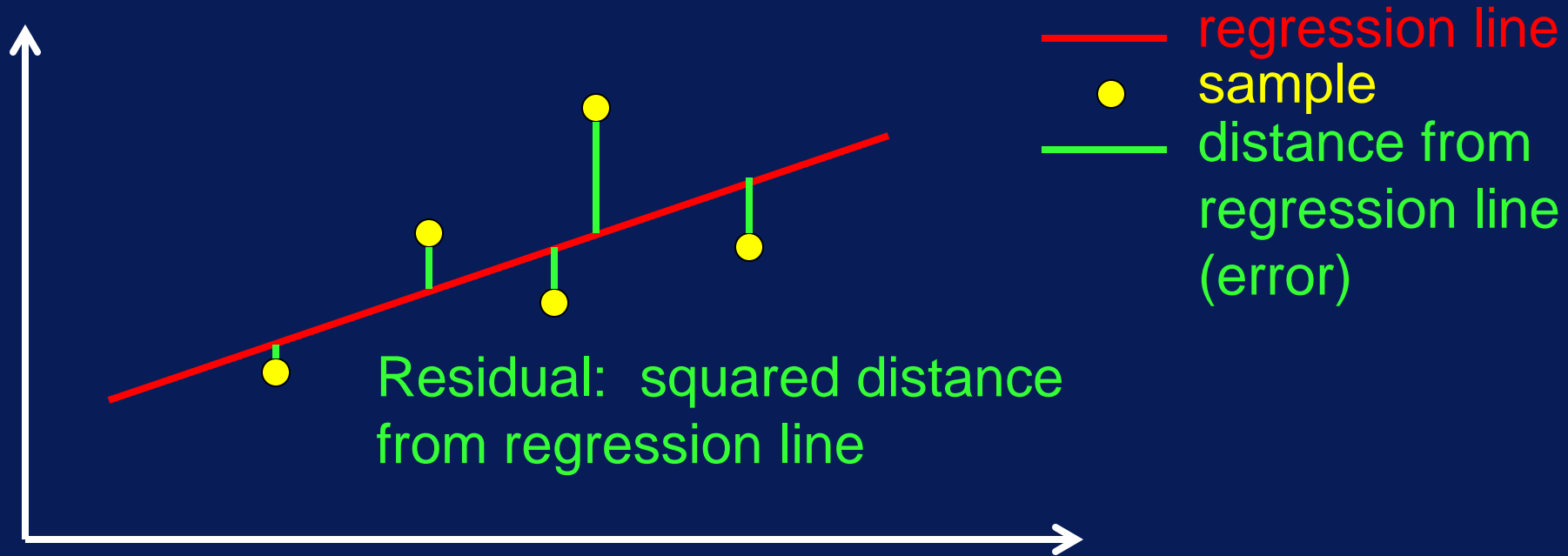


# Least Squares Algorithm



Training linear regression model adjusts model parameters to fit samples

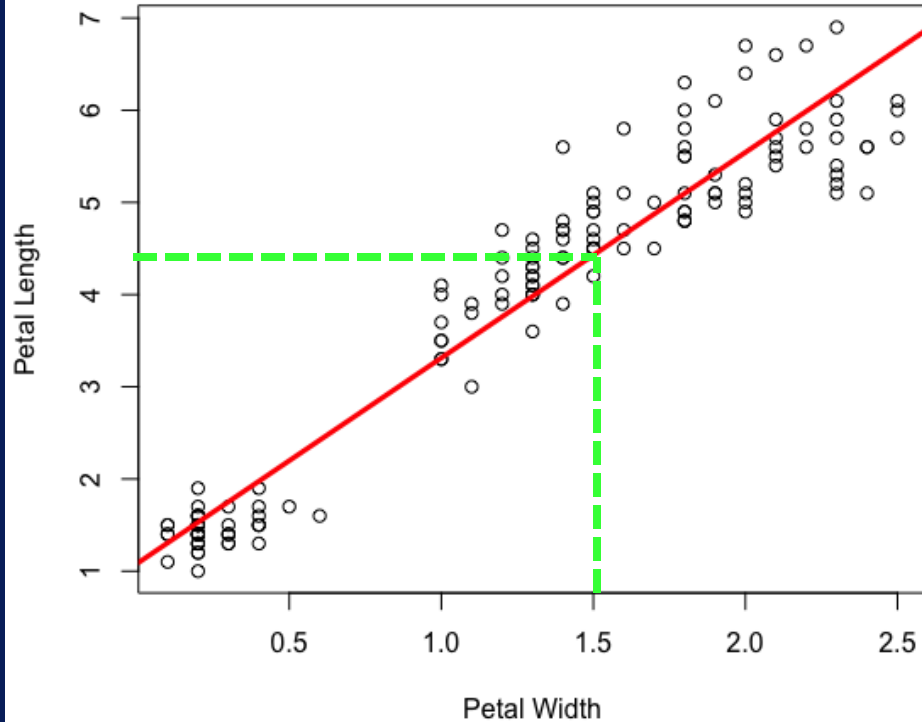
# Least Squares Method



**Goal:** Find regression line that makes sum of residuals as small as possible



# Linear Regression Model



## Applying model:

Given petal width = 1.5,  
prediction is  
petal length = 4.5


# Types of Linear Regression

**Simple Linear Regression**



var1

A light blue oval containing the text 'var1'.



Input has one variable

A white curly bracket pointing upwards from the text 'Input has one variable' to the 'var1' oval.

**Multiple Linear Regression**



var1

A light blue oval containing the text 'var1'.

var2

A light blue oval containing the text 'var2'.

...

Three small white dots representing an ellipsis.

varN

A light blue oval containing the text 'varN'.



Input has >1 variables

A white curly bracket pointing upwards from the text 'Input has >1 variables' to the row of three ovals ('var1', 'var2', 'varN').

# Linear Regression Summary

- Captures linear relationship between numerical output and input variables
- Model can be fitted using least squares