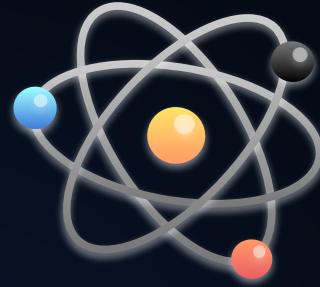


# AI CLUB

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Welcome to Meeting #4!



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1st Step of  
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Training  
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# Steps for Artificial Neural Network

Step 1:

Step 2:

Step 3:

# Toy Dataset

Hours Studied	0	1	2	3	4	5	6	7	8
Percentage	20	30	40	50	60	70	80	90	100

```
import numpy as np
np.random.seed(0)    # For repeatability

class Dense_Layer:
    def __init__(self, n_inputs, n_neurons):
        self.weights = 0.01 * np.random.randn(n_inputs, n_neurons)
        self.biases = np.zeros([1, n_neurons])

    def forward(self, inputs):    # inputs is X
        self.outputs = np.dot(inputs, self.weights) + self.biases

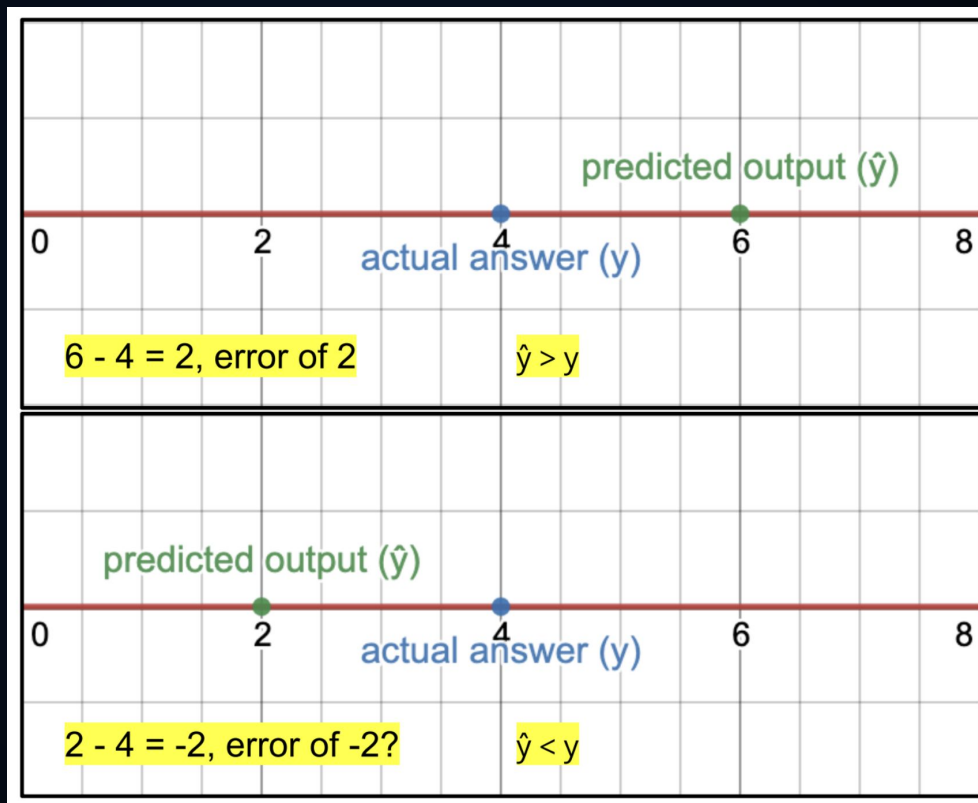
# hours studied
X = np.array([[0], [1], [2], [3], [4], [5], [6], [7], [8]])    # one input feature for each example
# percentage
y = np.array([[20], [30], [40], [50], [60], [70], [80], [90], [100]])    # one output feature for each example

dumb_model1 = Dense_Layer(1, 1)    # 1 input feature, 1 neuron (output feature)
dumb_model1.forward(X)
print(dumb_model1.outputs)

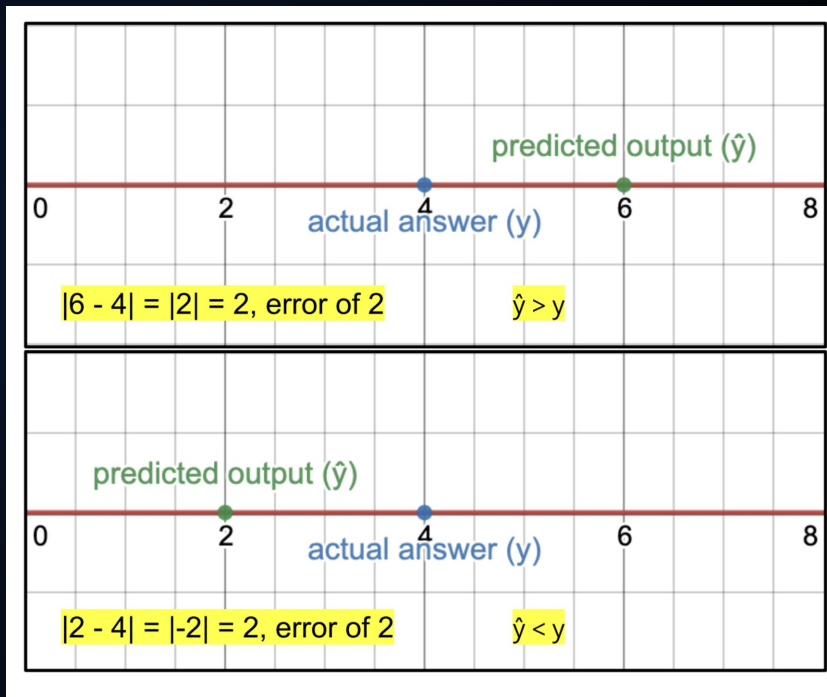
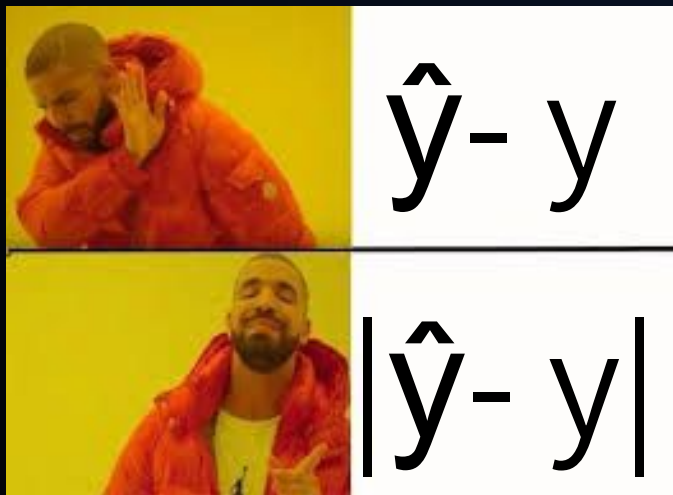
dumb_model2 = Dense_Layer(1, 1)    # 1 input feature, 1 neuron (output feature)
dumb_model2.forward(X)
print(dumb_model2.outputs)
```

# Mean Absolute Error (MAE)

$$\hat{y} - y?$$



# Mean Absolute Error (MAE)



# MAE for One Example with Multiple Output Features

$$\frac{|\hat{y}_1 - y_1| + |\hat{y}_2 - y_2| + \dots + |\hat{y}_n - y_n|}{n} = \frac{1}{n} \sum_{i=1}^n |\hat{y}_i - y_i|$$



# MAE for Multiple Examples with Multiple Output Features

$$\frac{[(\frac{1}{j} \sum_{i=0}^j |\hat{y}_{1i} - y_{1i}|) + (\frac{1}{j} \sum_{i=0}^j |\hat{y}_{2i} - y_{2i}|) + \dots + (\frac{1}{j} \sum_{i=0}^j |\hat{y}_{ni} - y_{ni}|)]}{n}$$

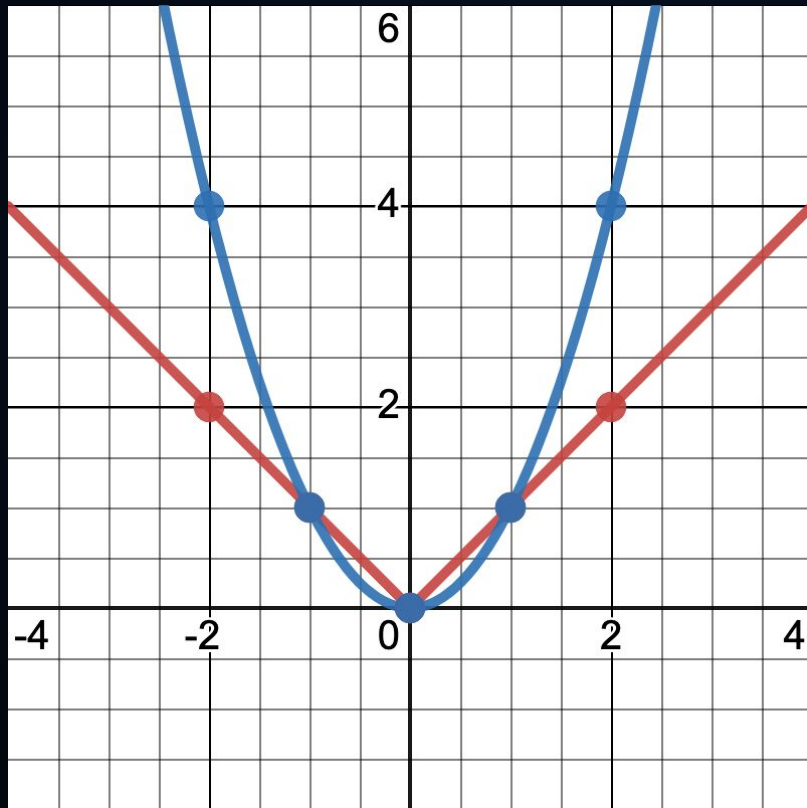
$$\text{MAE} = \text{mean}(|\hat{y} - y|)$$

# MAE & MSE Final Equations

$$\text{MAE} = \text{mean}( |\hat{y} - y| ).$$

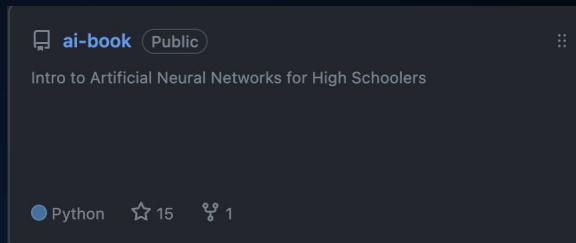
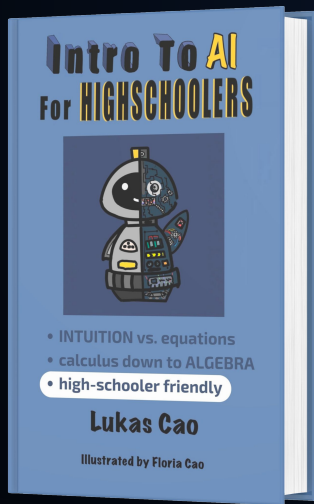
$$\text{MSE} = \text{mean}( (\hat{y} - y)^2 ).$$

# MAE vs. MSE



# Homework

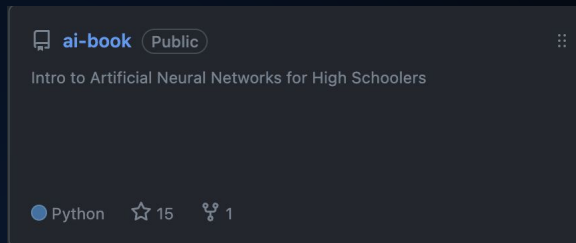
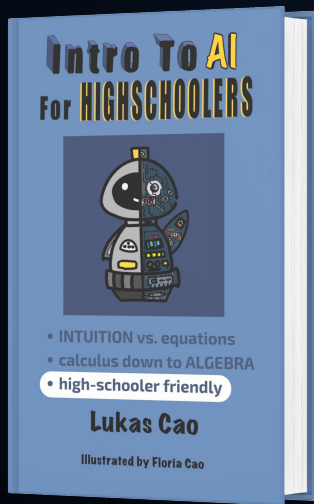
## Chapter 02



<https://github.com/ohhh25/ai-book/blob/main/Chapter%202/Chapter%2002.pdf>

# Homework

## Chapter 03



<https://github.com/ohhh25/ai-book/blob/main/Chapter%2003/Chapter%2003.pdf>