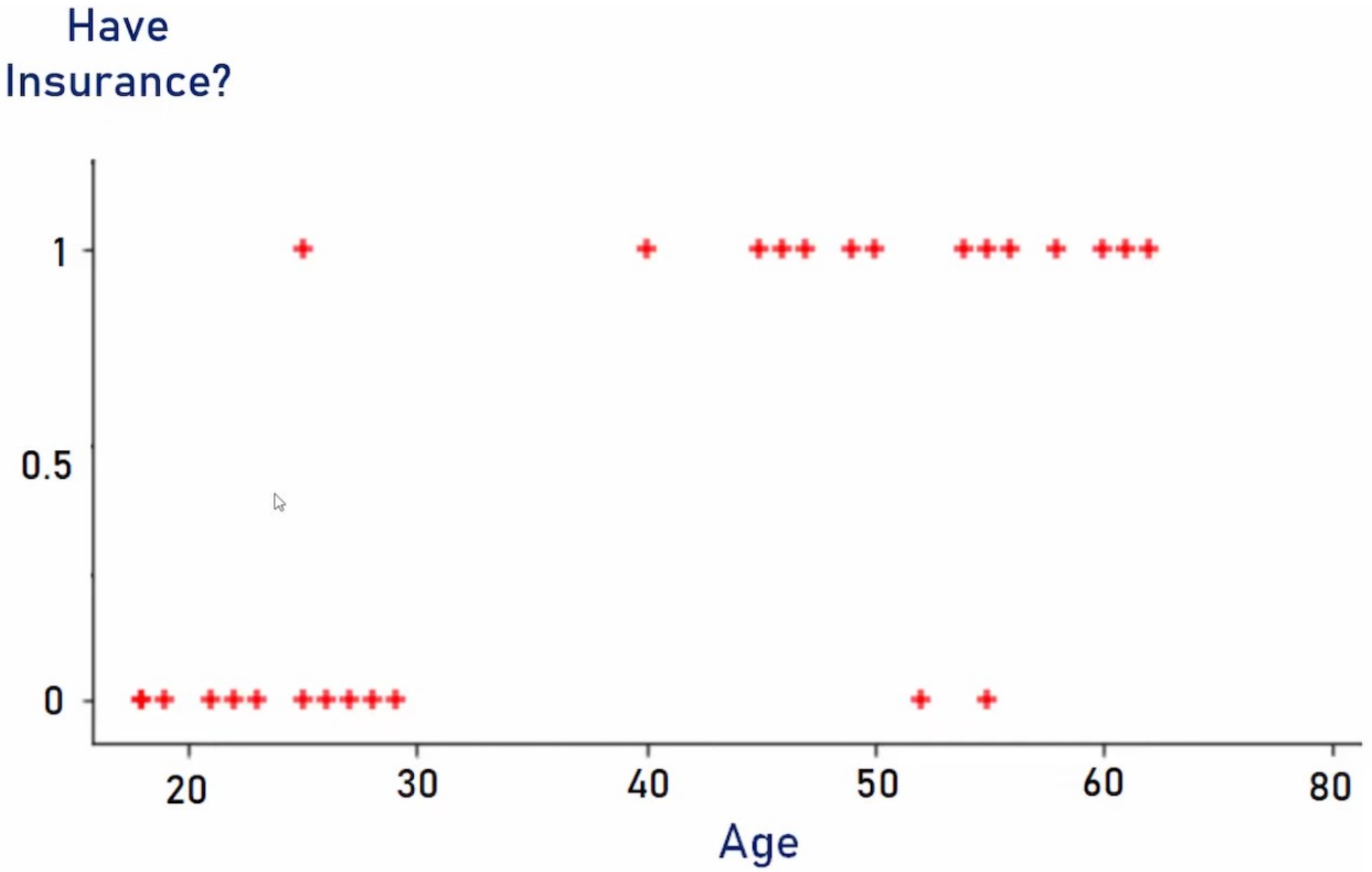
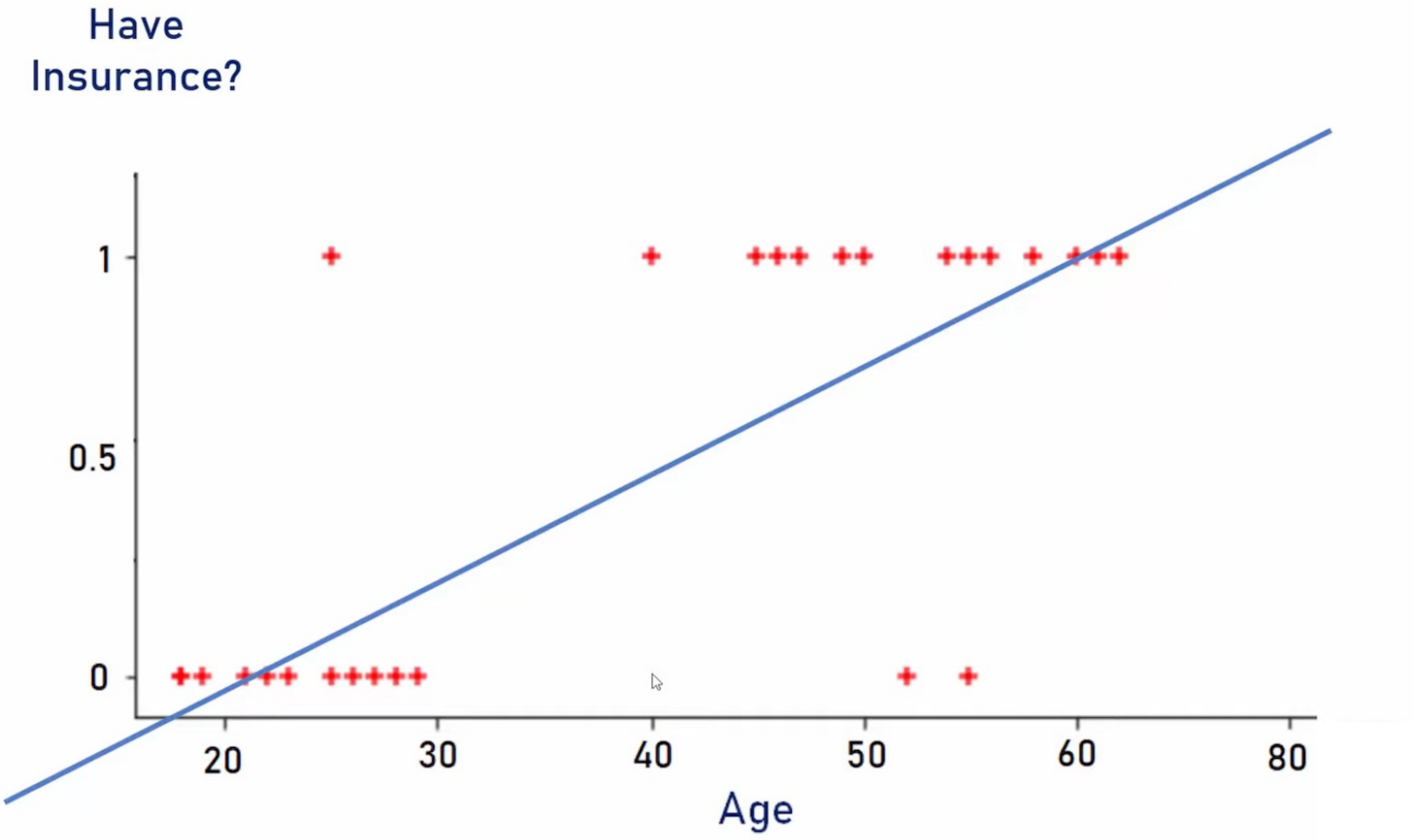
Simple Representation of a Neuron

age	have_insurance
22	0
25	0
47	1
52	0
46	1
56	1
55	0
60	1
62	1
61	1
18	0
28	0
27	0
29	0
49	1

Binary Classification

Given an age of a person, come up with a **function** that can predict if person will buy insurance or not


Have Insurance?
1
0.5
0
20
30
40
50
60
80
Age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0.5
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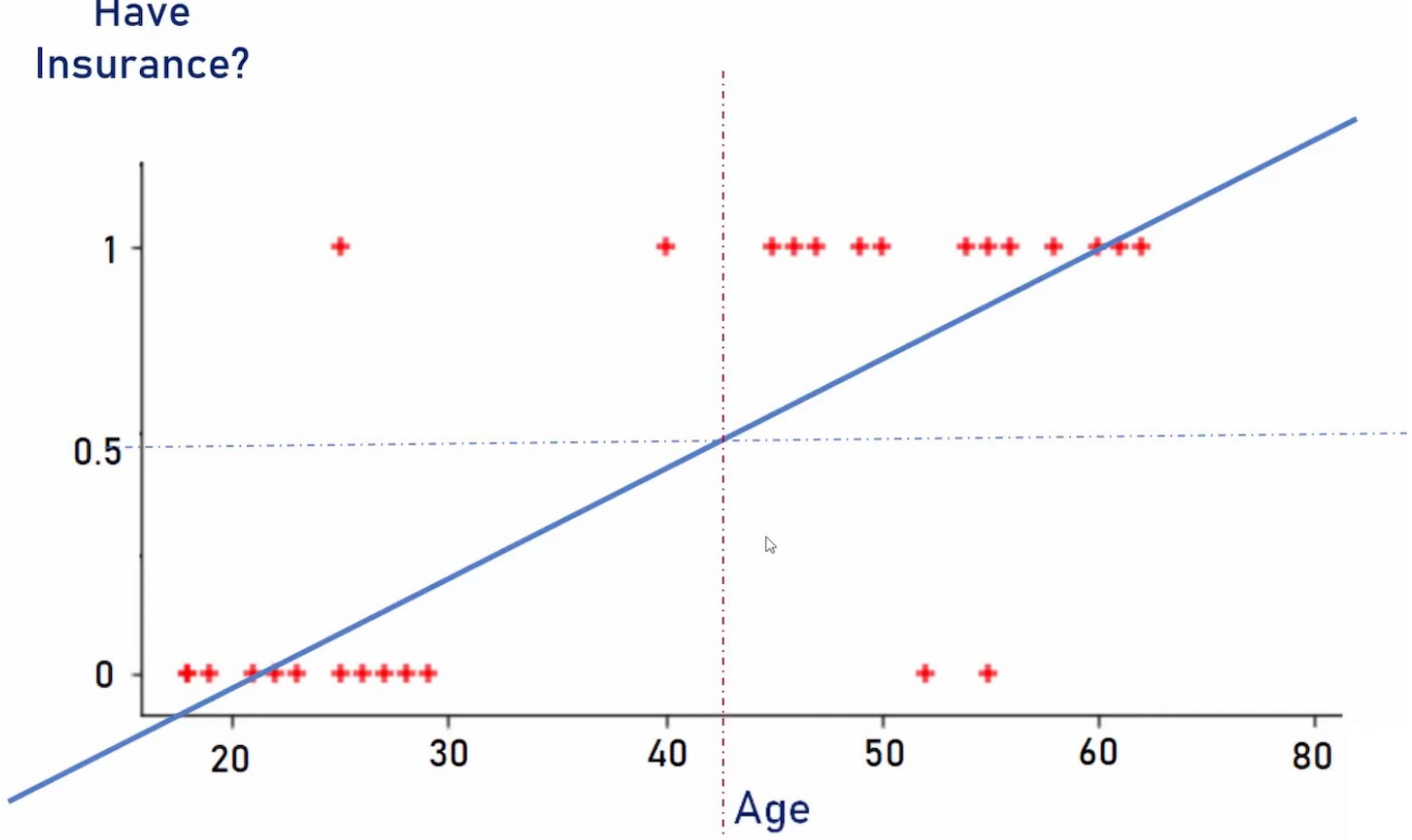
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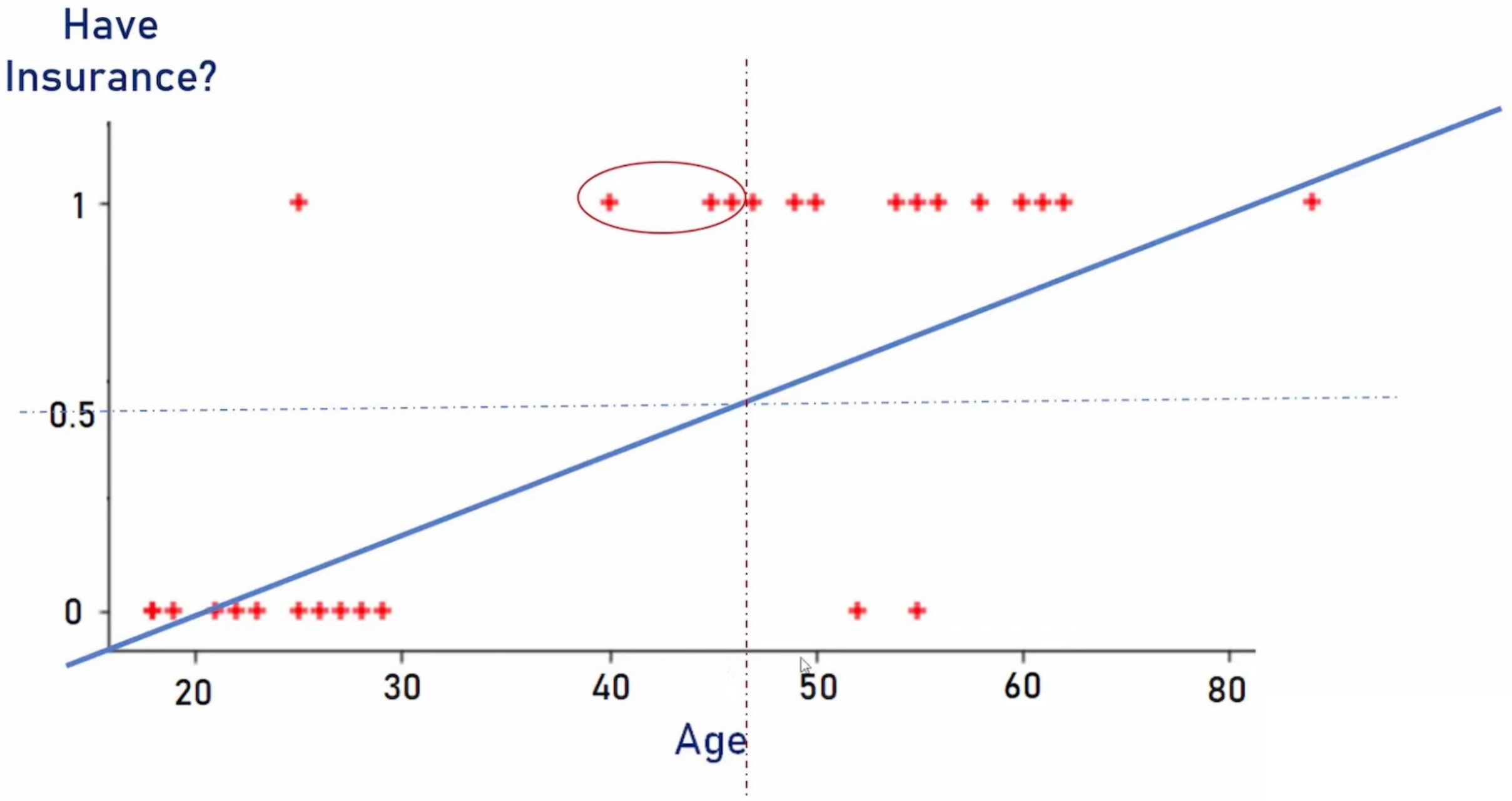
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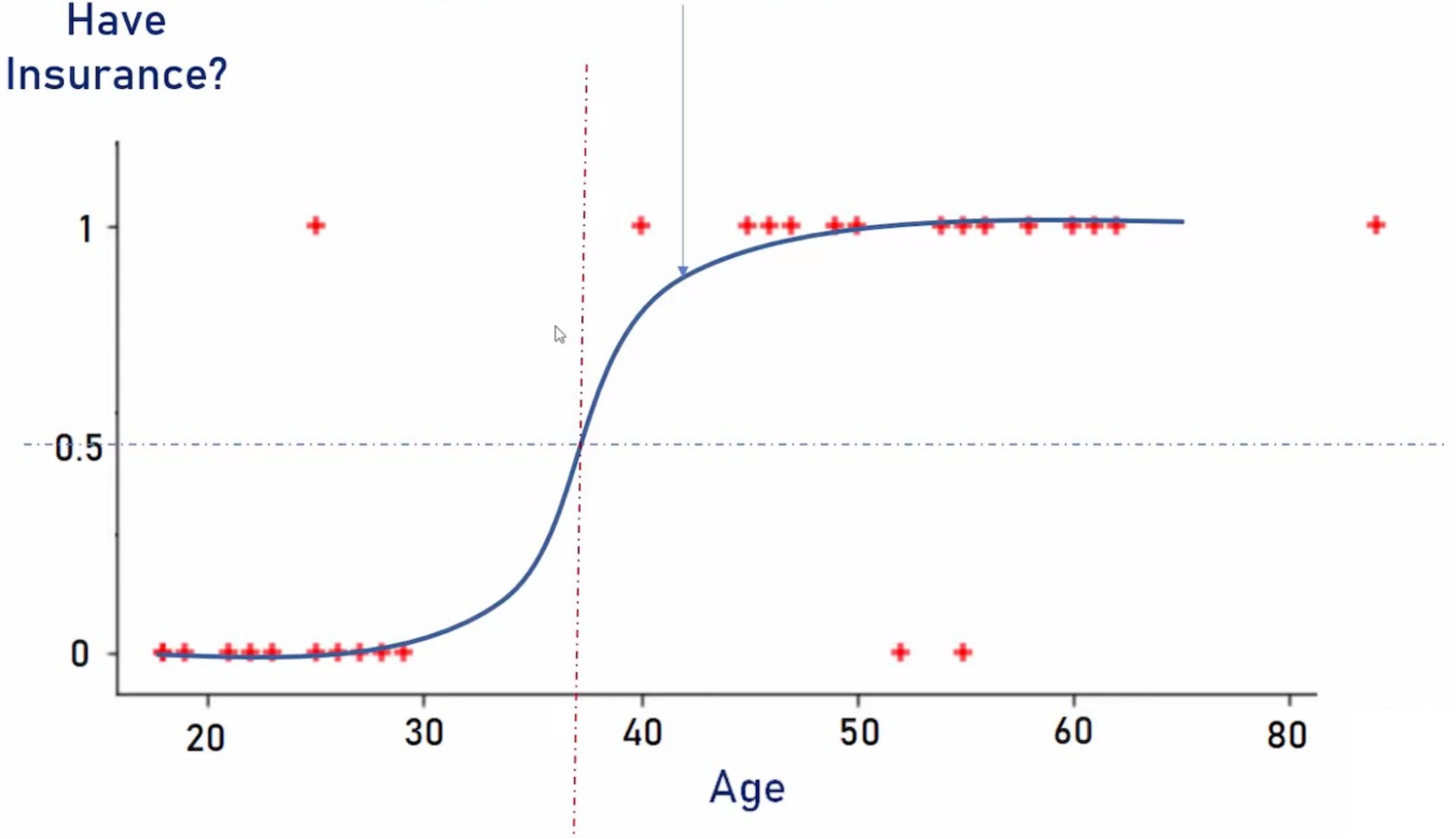
Sigmoid or Logit Function



$$sigmoid(z) = \frac{1}{1 + e^{-z}}$$

e = Euler's number ~ 2.71828

$$sigmoid(200) = \frac{1}{1+2.71^{-200}}$$ = almost close to 1

$$sigmoid(-200) = \frac{1}{1+2.71^{200}}$$ = almost close to 0

Sigmoid function converts input into range 0 to 1

Step 1

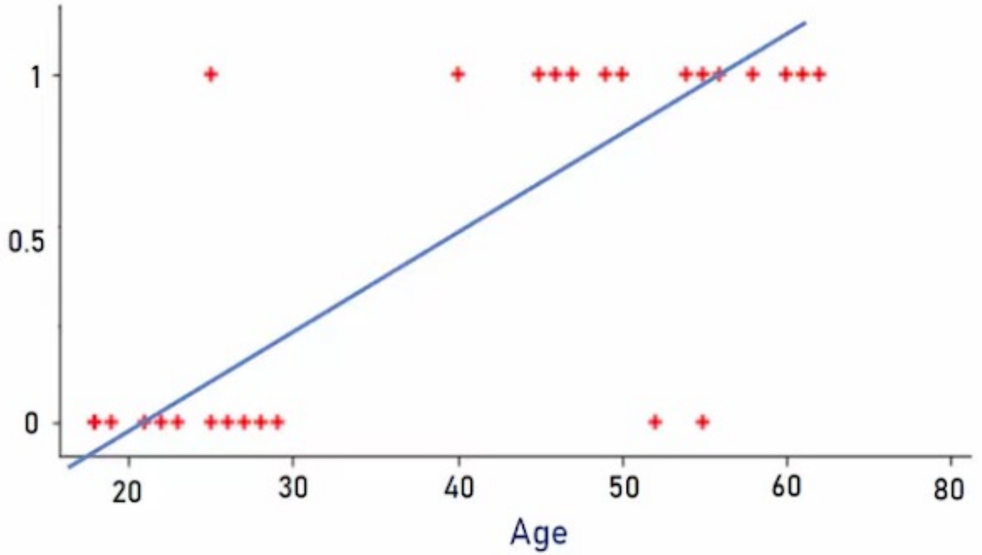
$$y = m * x + b$$

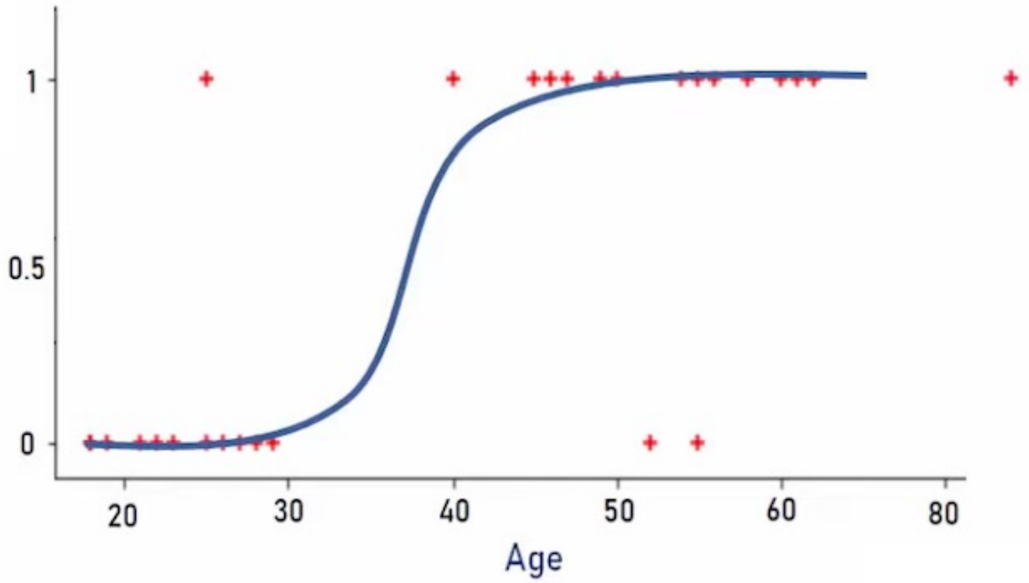
Age

Step 2

$$z = \frac{1}{1 + e^{-y}}$$

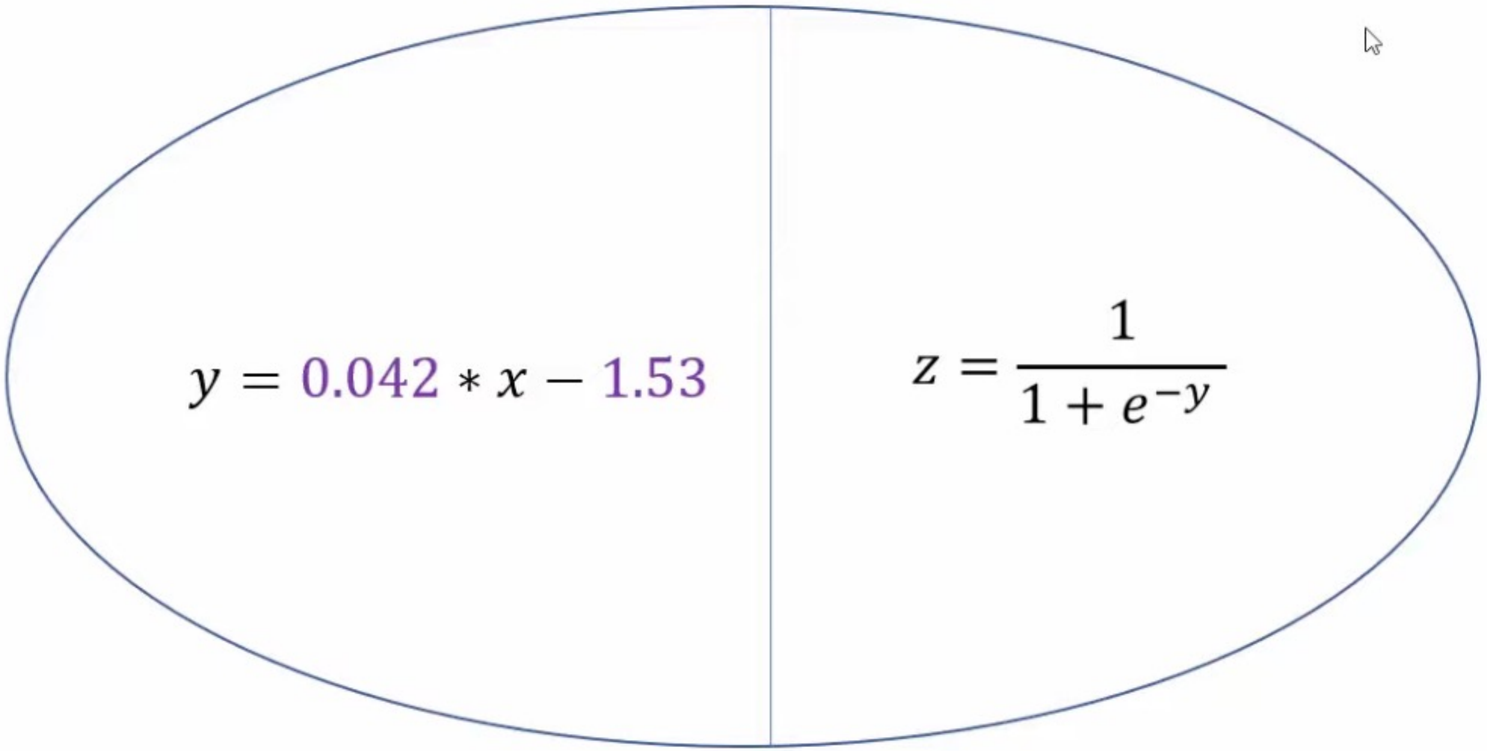
If person will buy insurance





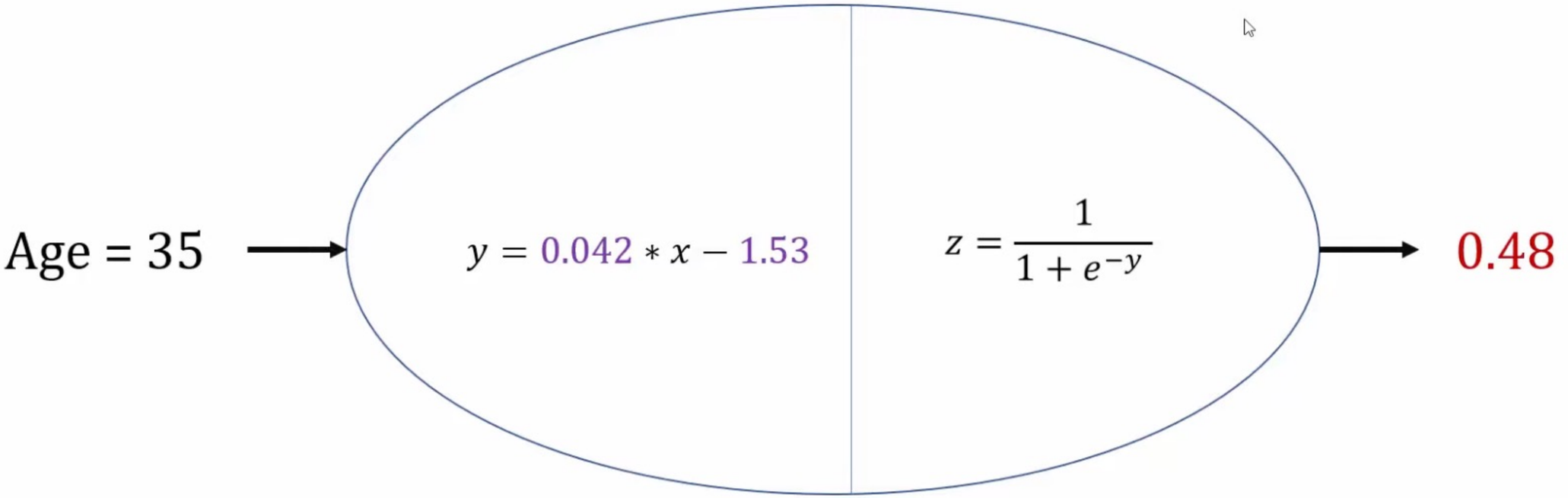
$$y = 0.042 * x - 1.53$$

Age


$y = 0.042 * x - 1.53$
$z = \frac{1}{1 + e^{-y}}$

value < 0.5 = person will not buy insurance

value >= 0.5 = person **will** buy insurance



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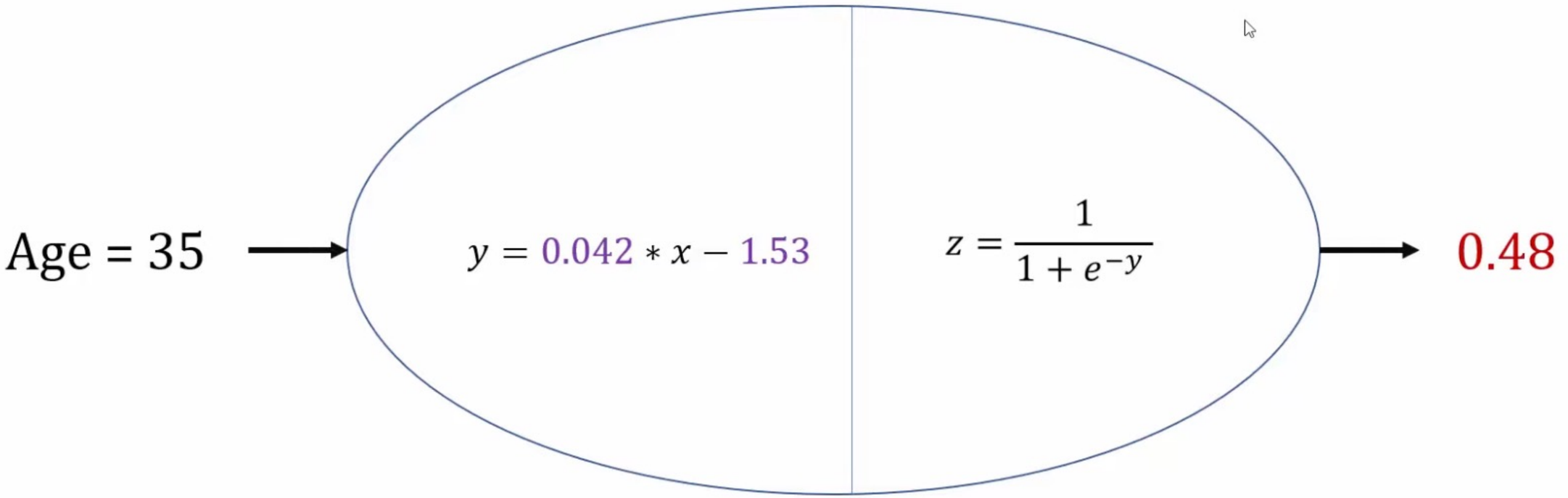


$$y = 0.042 * x - 1.53$$

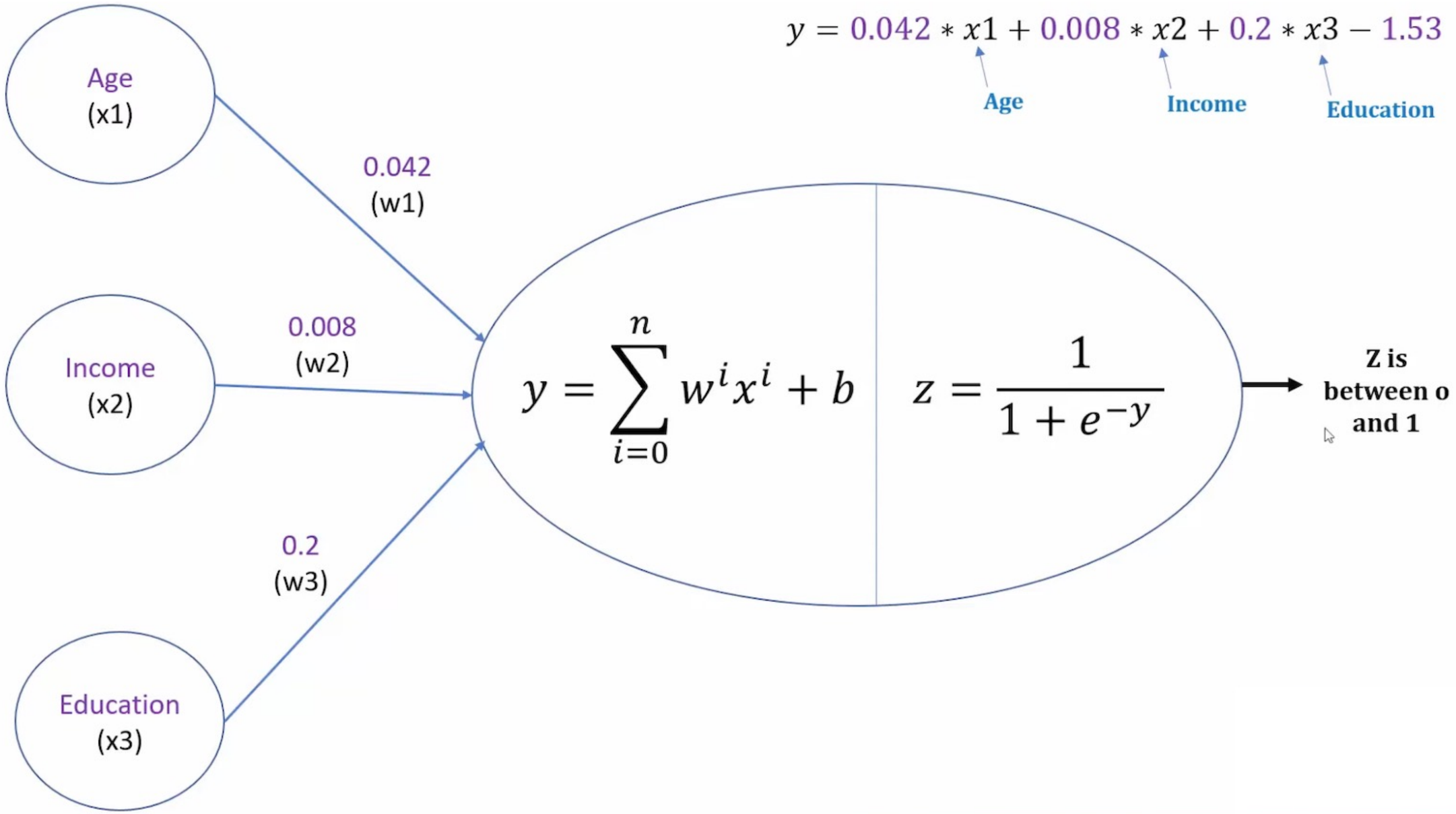
Age

$$y = 0.042 * x1 + 0.008 * x2 + 0.2 * x3 - 1.53$$

Age Income Education

$$y = w1 * x1 + w2 * x2 + w3 * x3 + b$$

$$y = \sum_{i=0}^{n} w^i x^i + b$$


$y = 0.042 * x1 + 0.008 * x2 + 0.2 * x3 - 1.53$
Age
Income
Education
Age
(x1)
Income
(x2)
Education
(x3)
0.042
(w1)
0.008
(w2)
0.2
(w3)
$y = \sum_{i=0}^{n} w^i x^i + b$
$z = \frac{1}{1 + e^{-y}}$
Z is between o and 1