Machine Learning Assignment

Question 1)

The final values are:
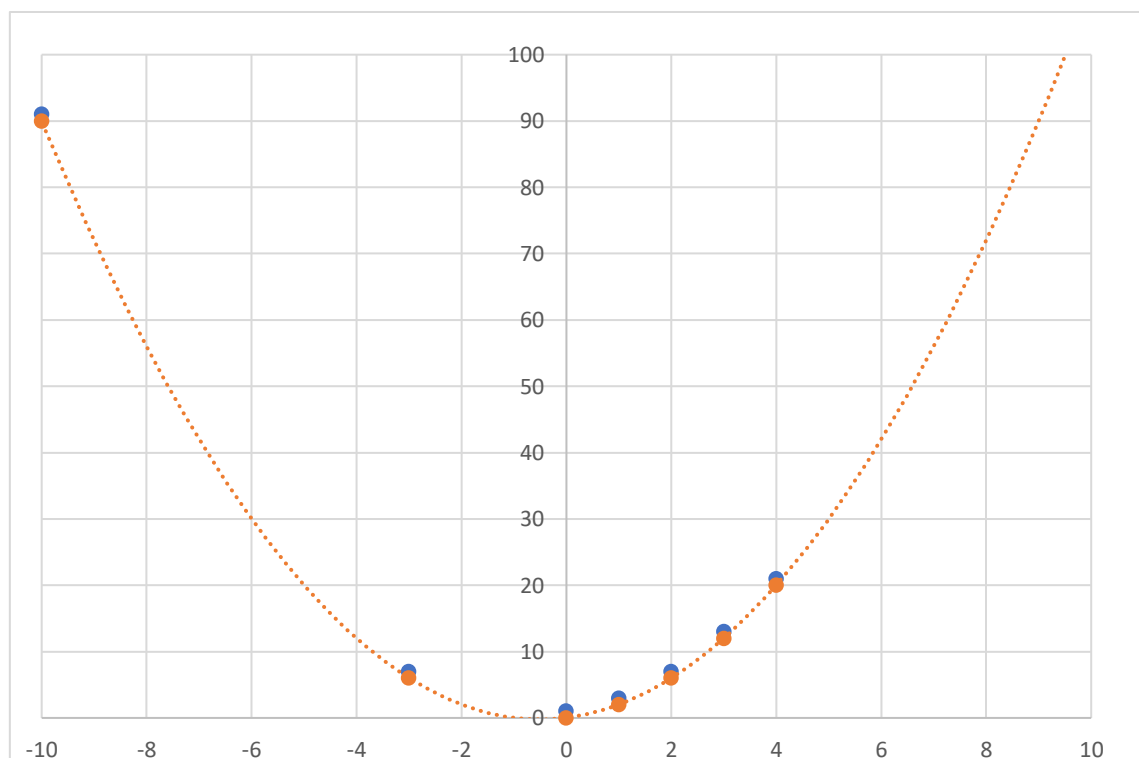
W0=0.00825207491313205

W1=1.00011391639305

W2=1.00009803516569

Using the hypothesis hw(x) = $w_0 + w_1x + w_2x^2$, initial values of W0=W1=W2=0, alpha as 0.00000001 and 100000 epochs:

x	y	Equation
-100	9901	9900.977
-10	91	90.01692
-3	7	6.008793
0	1	0.008252
1	3	2.008464
2	7	6.008872
3	13	12.00948
4	21	20.01028
10	111	110.0192
100	10101	10101

Question 2)

The final values are:

W0=-6.76753856466424

W1=2.78781160570177

W2=0.110874350937081

Using the hypothisis hw(x) = g(w_0 + w_1x_1 + w_2x_2) with the sigmoid function and

x_2 = (- w_1*x_1 - w_0) / w_2

With initial starting values of W0=W1=W2=0, an alpha of 0.00001 and 1000000 epochs:

x1	x2	y	Equation
1	1	0	35.89403
2	2	0	10.75015
0.3	1.2	0	53.49474
0.6	0.8	0	45.95158
1.2	1	0	30.86525
1.3	1	0	28.35086
1.8	2	0	15.77892
1.5	1.4	0	23.32209
3	3	1	-14.3937
4	4	1	-39.5376
3.1	3.3	1	-16.9081
3.6	3.8	1	-29.4801
3.8	2.1	1	-34.5088
3.5	2.2	1	-26.9657
3.25	2.8	1	-20.6797
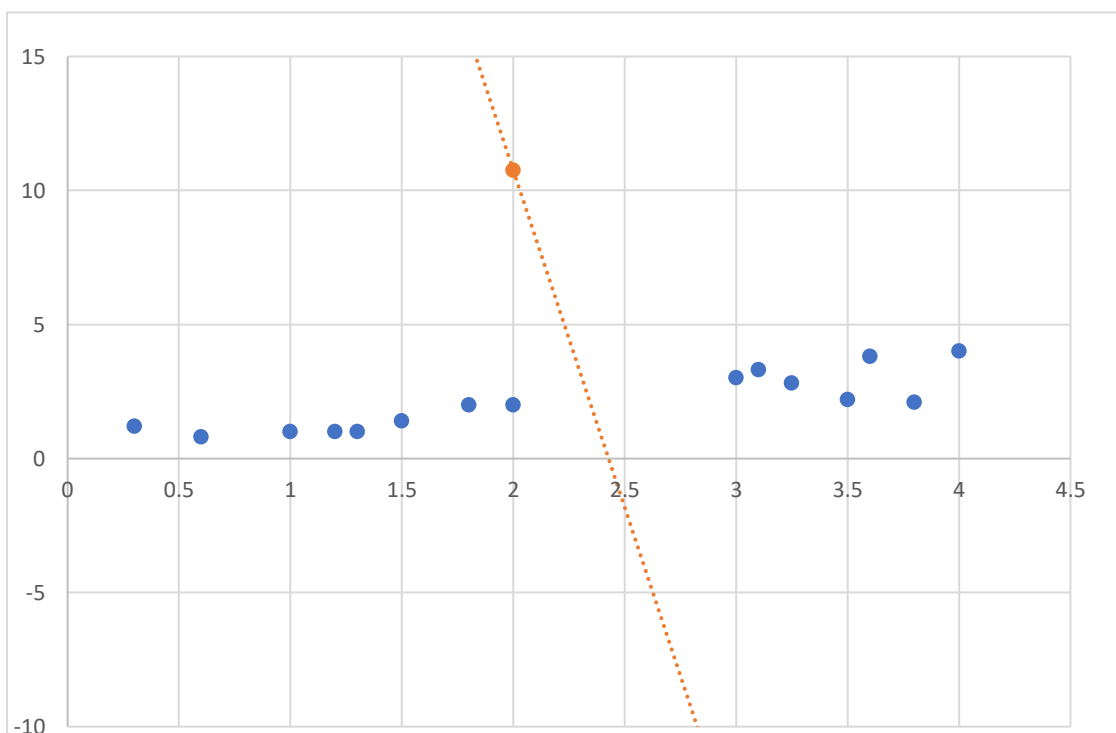
Question 3) XNAND NN
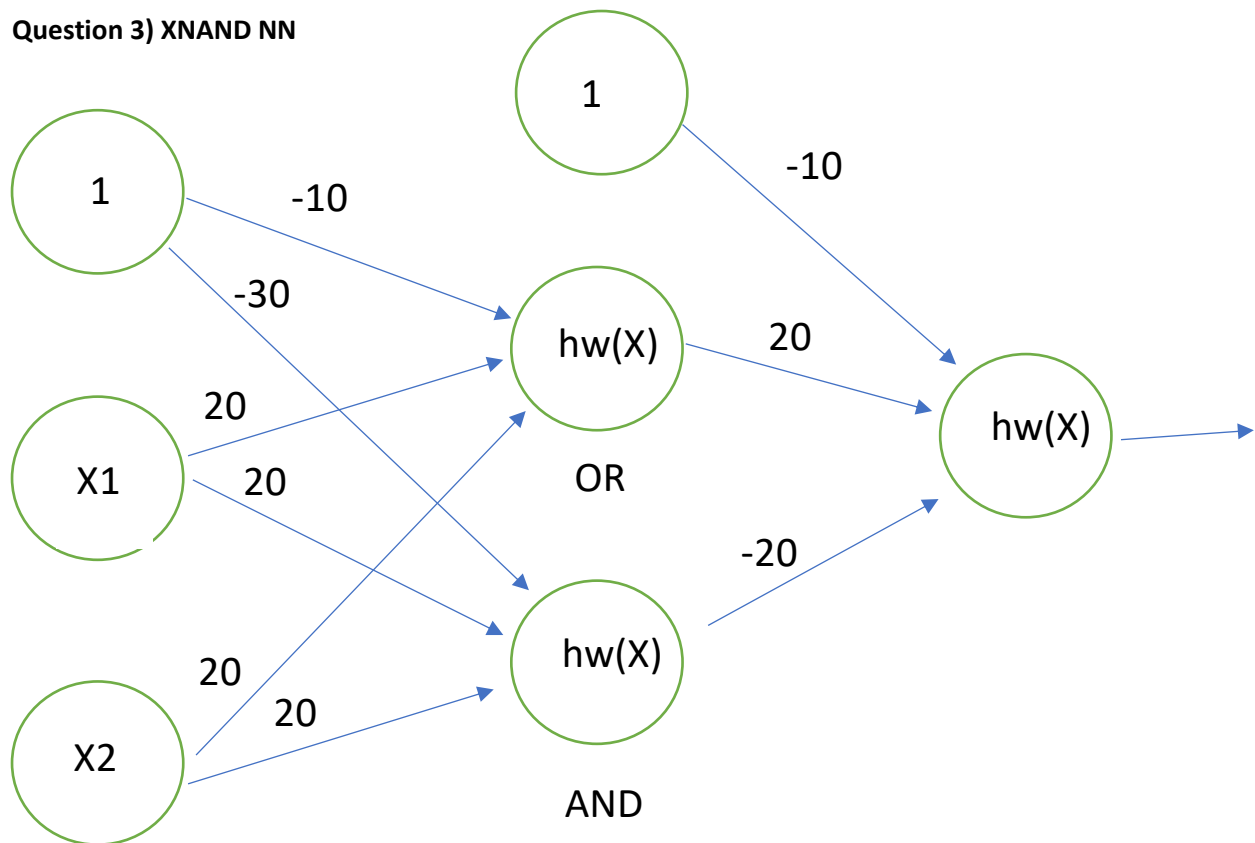
X1	X2	Z	g(Z)
0	0	-10	0
0	1	10	1
1	0	10	1
1	1	-10	0

0 XNAND 0 = 0

0 XNAND 1 = 1

1 XNAND 0 = 1

1 XNAND 1 =1