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Q-1 $\Sigma x = 30806$ $\Sigma x^2 = 105821236$

$\Sigma y = 494800$ $\Sigma y^2 = 25959740000$

$\Sigma xy = 1631016000$

(a) $y = a + bx$

$$a = \frac{(\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy)}{n(\Sigma x^2) - (\Sigma x)^2} = 19370 = a$$

$$b = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2} = 9.774 = b$$

$y = 19370 + 9.774x$

(b) $b = 9.774$

$y = 19370$

(c) $y = 19370 + 9.774 \cdot 5000 = 68240 = y$

Q-2 (a) No, will not converge.

Because of negative class label and positive weight

(b)

Step	Weights	Score	Correct?	Update
1	[1,0,0,0]	1	No	[1,4,3,6]
2	[0,-4,-3,-6]	-20	No	[1,2,-2,3]
3	[1,-2,-5,-3]	-1+9=8	Yes	—
4	[1,-2,-5,-3]	-7-19=-26	Yes	—

Q-3 (a) $W_A = 1 + (-6) + 3 = -2$

$W_B = -1 + 2 = -1$

$W_C = 6 + 1 = 7$

y would be predicted by C class, as $W_C = 7$ is the largest. $y = C$

(b) $W_A = (1, 2, 3)$

$W_B = W_B + X$ $\quad W_B = (-1, 0, 2) + (1, -3, 1) = (0, -3, 3) = W_B$

$W_C = W_C - X$ $\quad W_C = (0, -2, 1) - (1, -3, 1) = (-1, 1, 0) = W_C$