Weighted Decision Tree

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January 13, 2024

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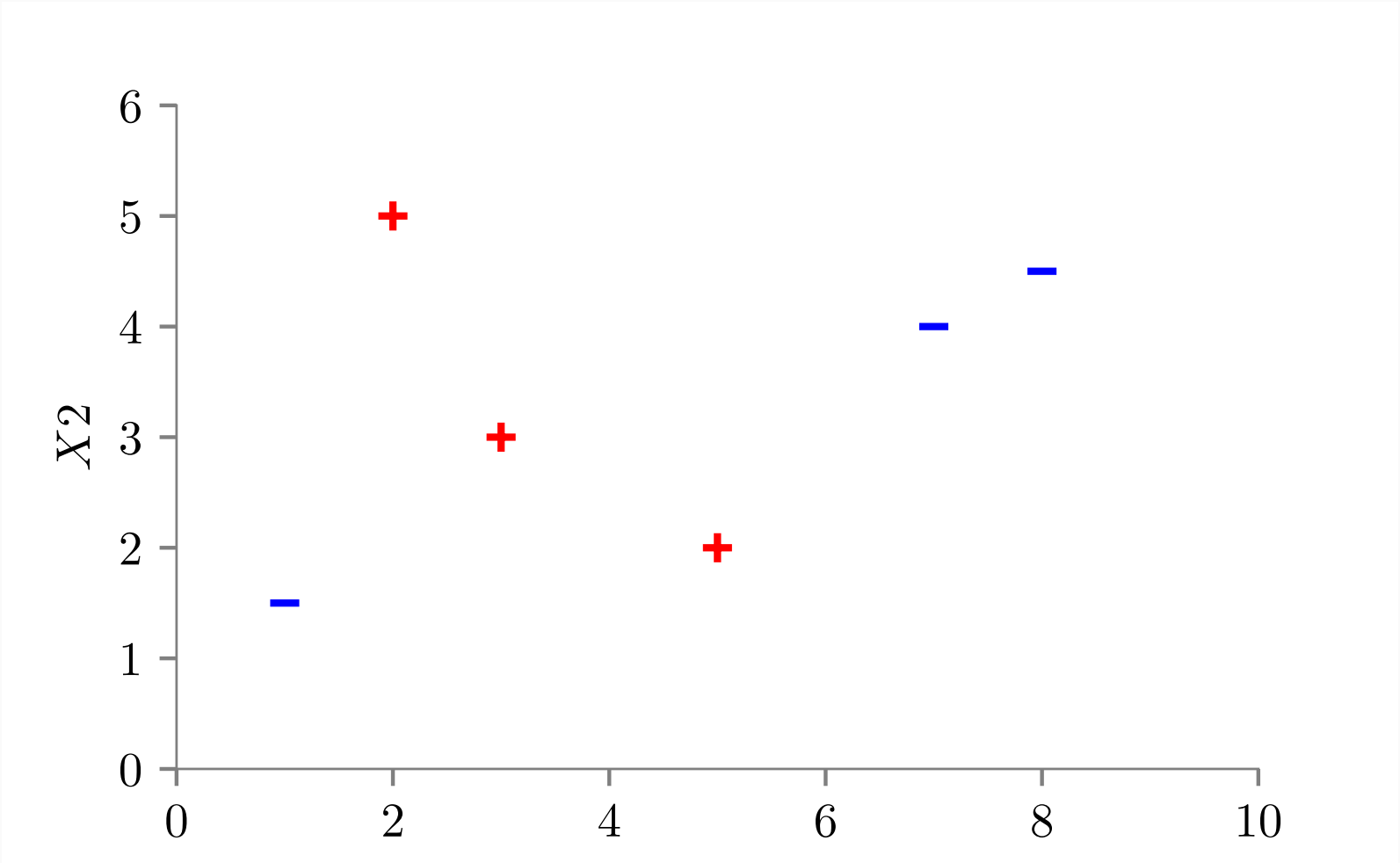
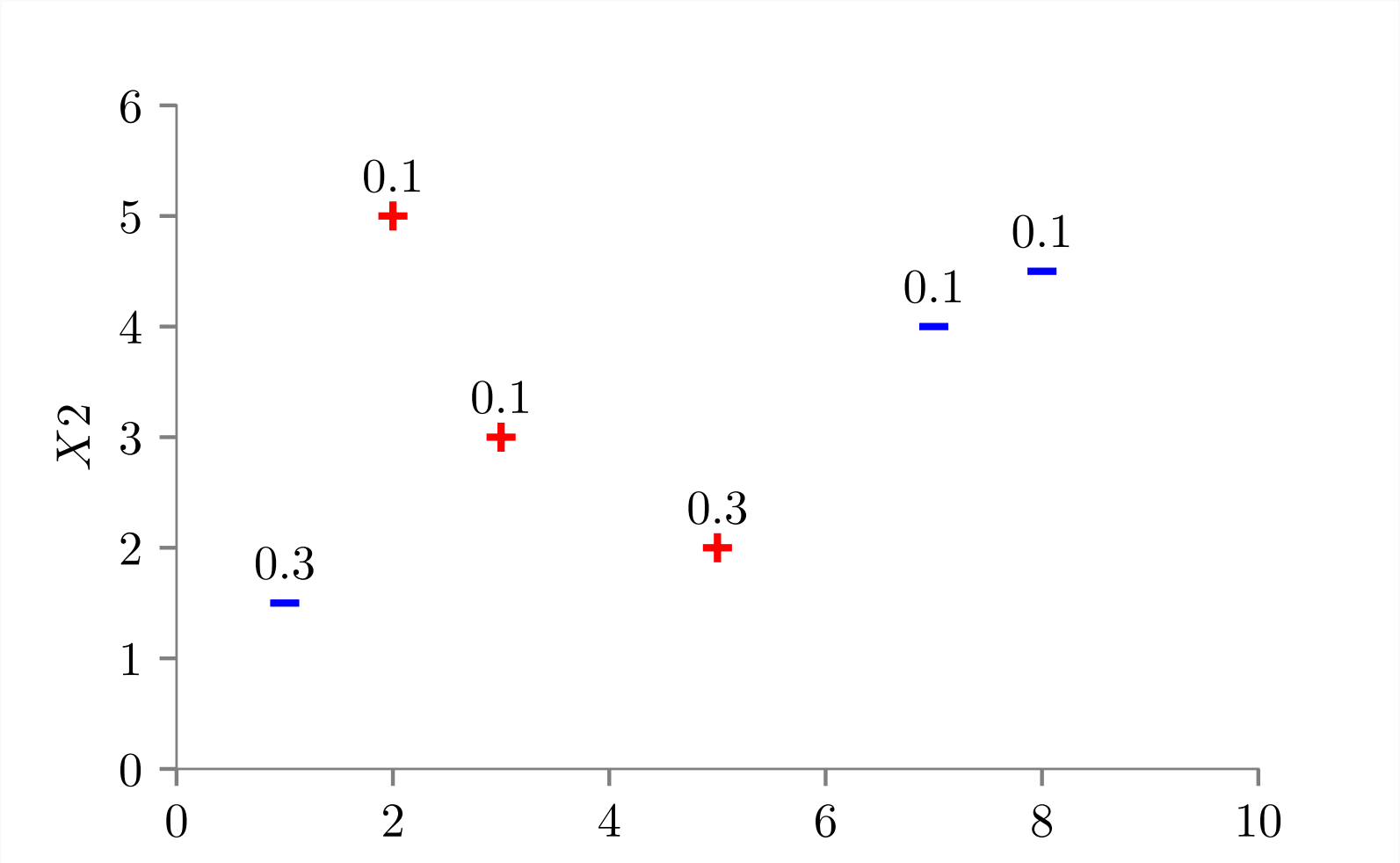
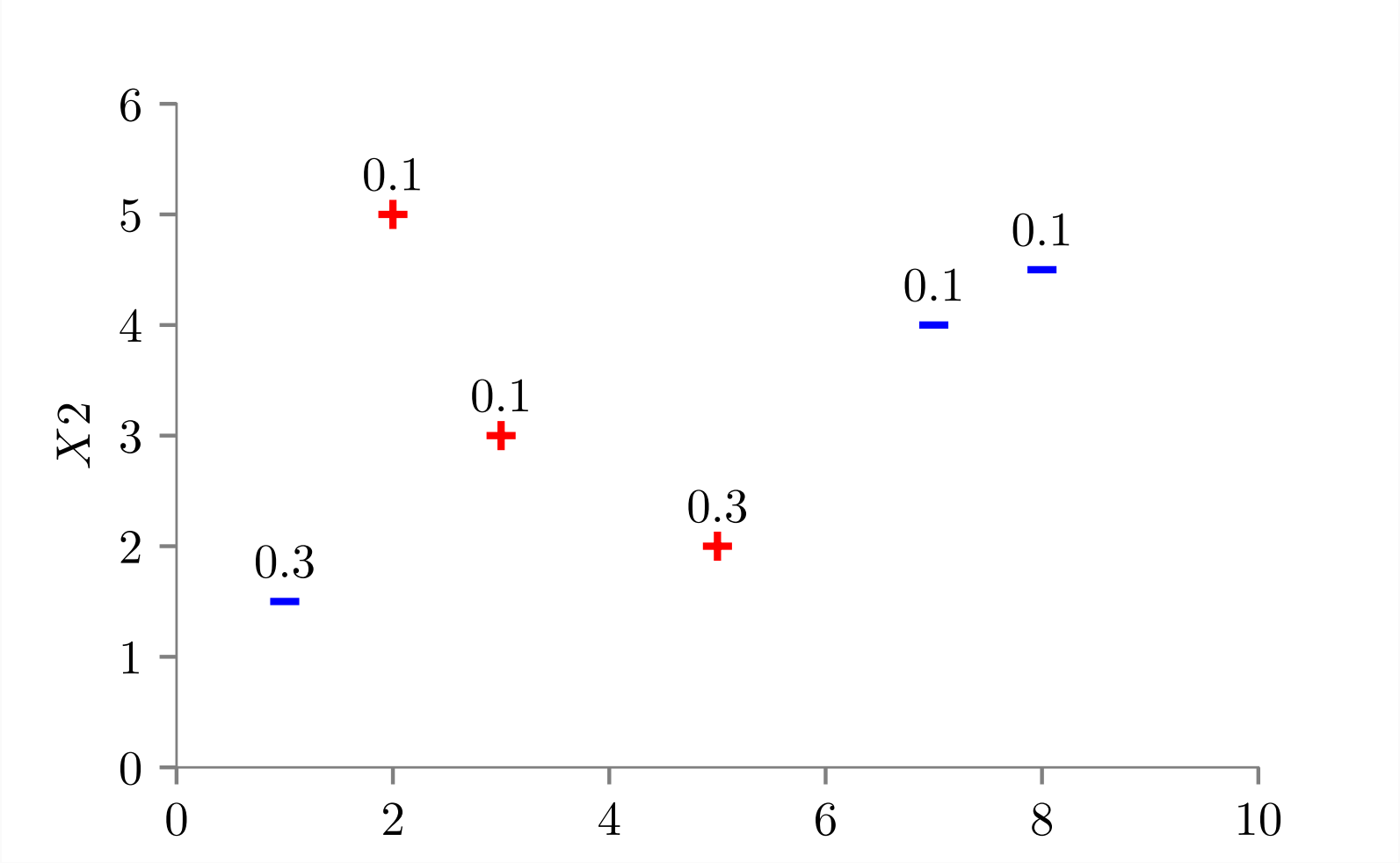

6
5
4
3
2
1
0
X2
0
2
4
6
8
10

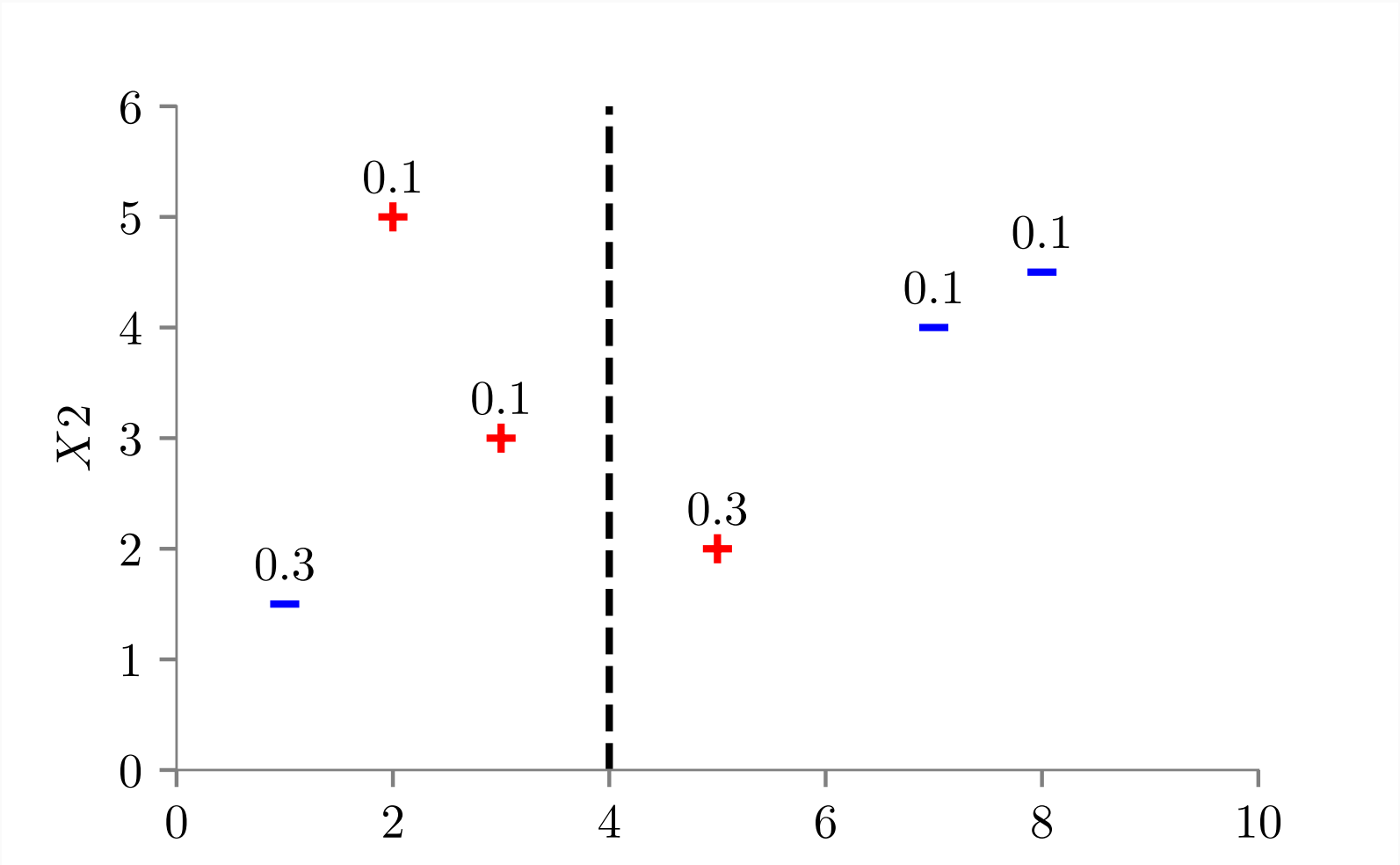

6
5
4
3
2
1
0
X2
0
2
4
6
8
10
0.1
0.1
0.1
0.3
0.3



$$ENTROPY = -P(+) \cdot \log_2 P(+) - P(-) \cdot \log_2 P(-)$$

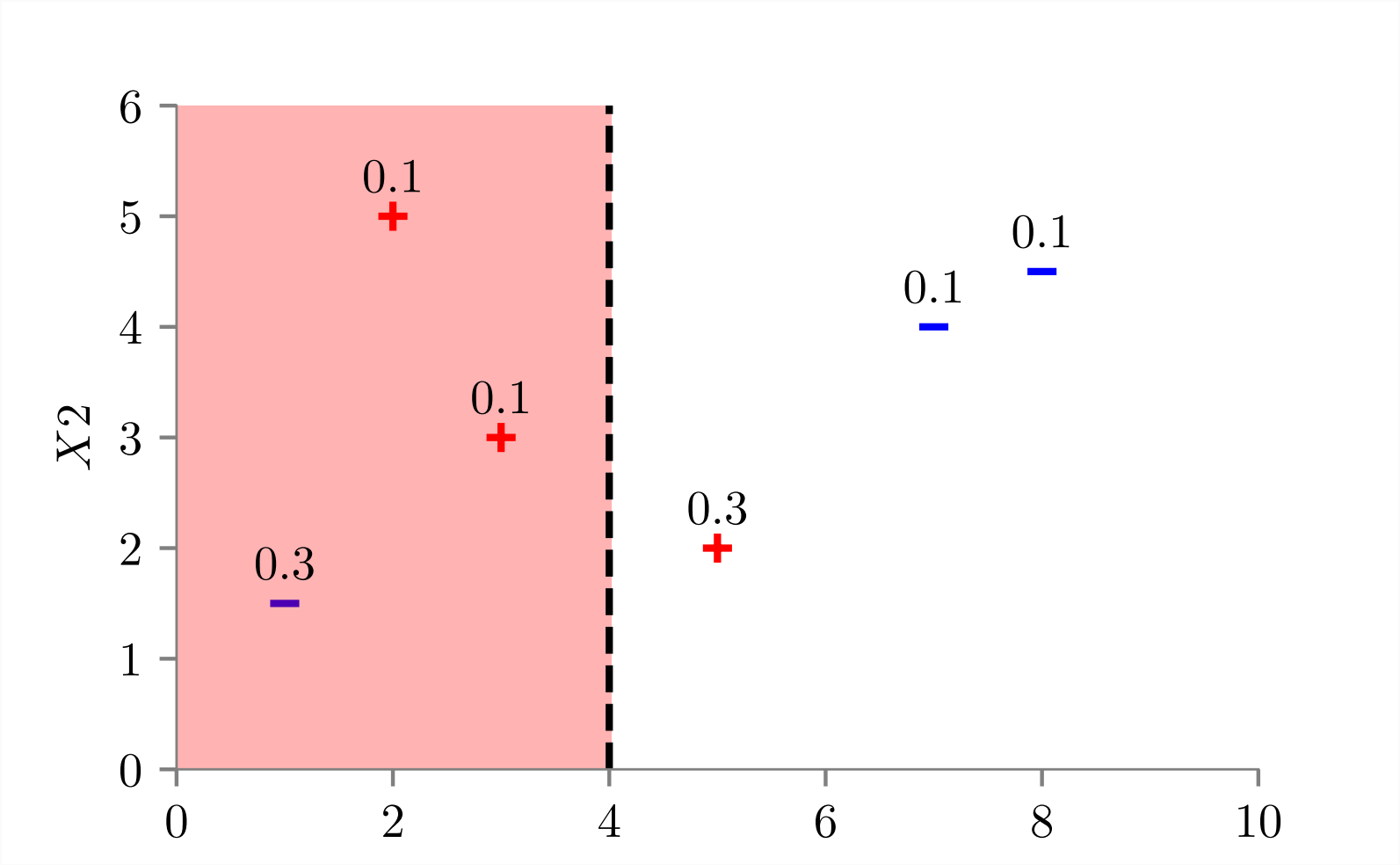
$$P(+) = \left(\frac{0.1+0.1+0.3}{1}\right) = 0.5,\ P(-) = \left(\frac{0.3+0.1+0.1}{1}\right) = 0.5$$

$$ENTROPY = E_s = -\frac{1}{2} \cdot log_2 \frac{1}{2} - \frac{1}{2} \cdot log_2 \frac{1}{2} = 1$$



$X1^* = 4$

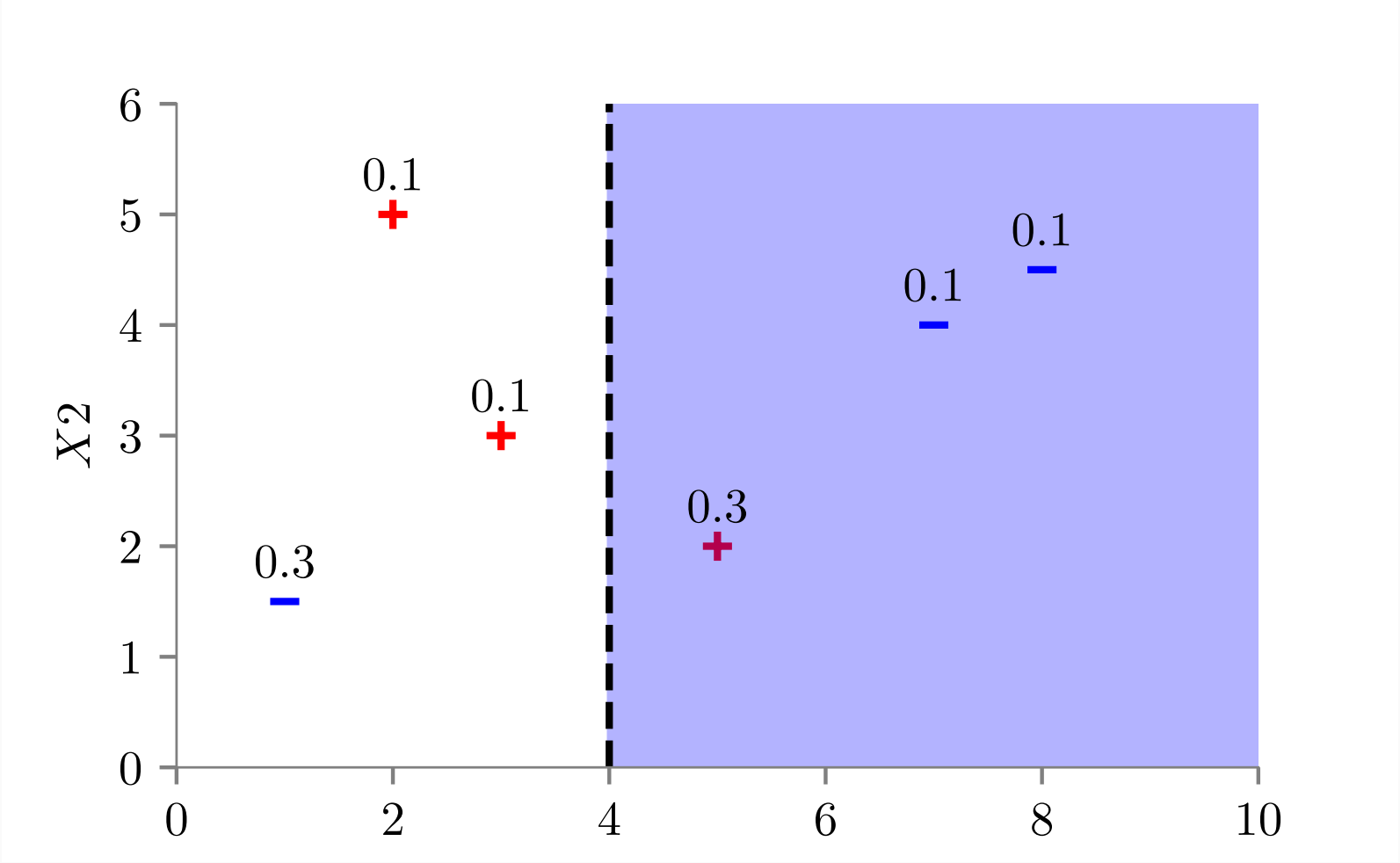
Candidate Line: $X1 = X!^*$



Entropy of $X1 \leq X1^* = E_{S(X1<X1^*)}$

$P(+) = \left(\frac{0.1+0.1}{0.1+0.1+0.3}\right) = \frac{3}{5}$

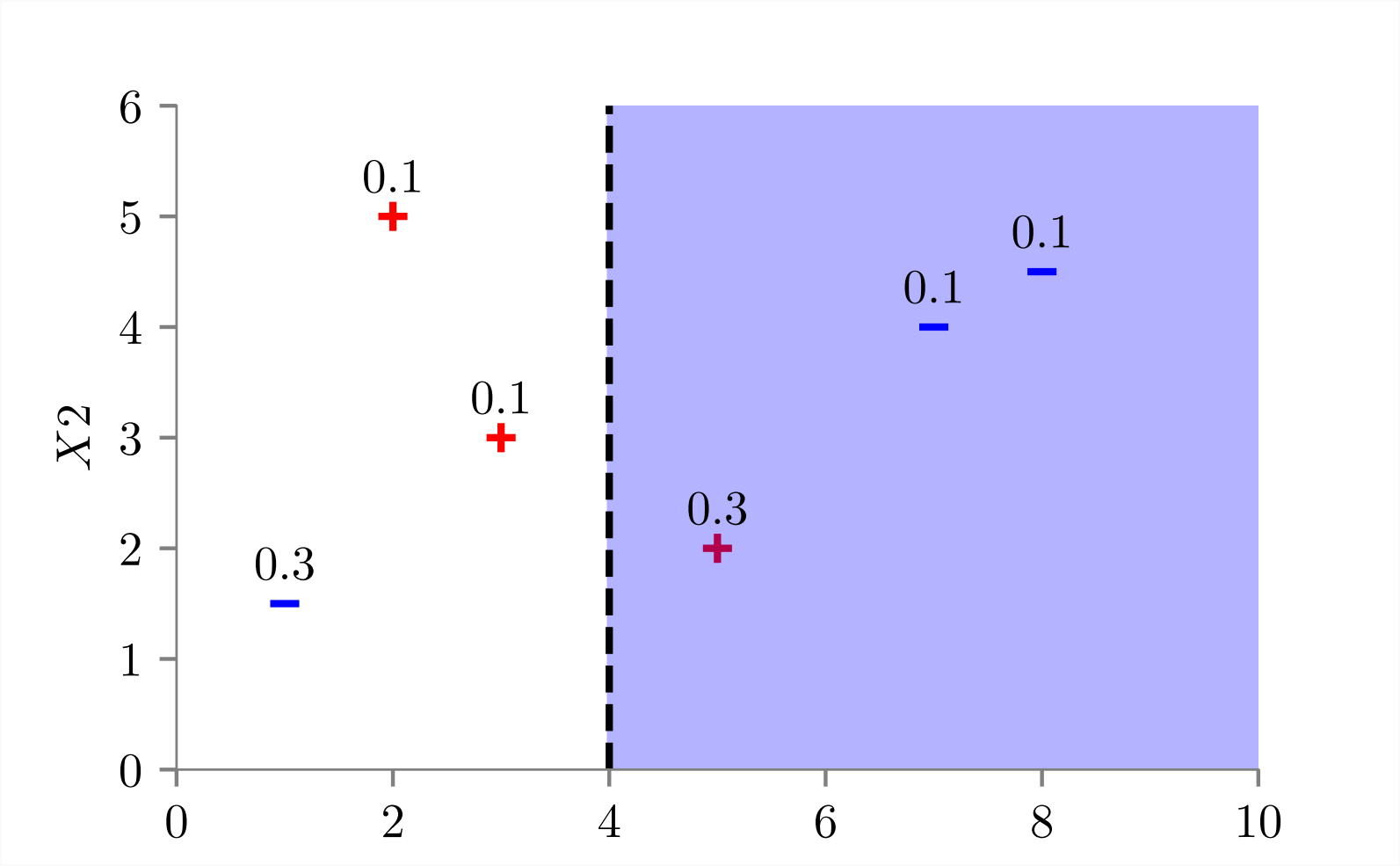
$P(-) = \frac{3}{5}$



Entropy of $X1 > X1^* = E_{S(X1>X1^*)}$

$P(+) = \left(\frac{3}{5}\right) = \frac{2}{5}$

$P(-) = \frac{3}{5}$



$$IG(X1 = X1^*) = E_S - \frac{0.5}{1} \cdot E_{S(X1<X1^*)} - \frac{0.5}{1} \cdot E_{S(X1>X1^*)}$$