Solutions

2.1

- Score $2(2) - 2 - 1 = 1 > 0$: predicted late ✓.

2.2

- Points nearest the boundary, where scores are small ✓.

2.3

- Held-out error: training error is an advertisement ✓.

3.1

- $\bar{x} = 3$, $\bar{y} = 4.4$ ✓.
- Deviations from the means give numerator 9.0 and denominator 10 ✓.
- Slope $w = 9/10 = 0.9$; intercept $b = 1.7$ ✓.
- Residuals $0.4, -0.5, -0.4, 0.7, -0.2$; SSE 1.1 ✓.
- Prediction at 6: $0.9 \times 6 + 1.7 = 7.1$ – an extrapolation beyond the data range ✓.

3.2

- Boundary: $x_1 + 2x_2 - 4 = 0$, i.e. $x_2 = (4 - x_1)/2$ ✓.
- $(2, 1)$: score $2 + 2 - 4 = 0$ – exactly on the boundary, maximally doubtful ✓.
- $(2, 1.5)$: score $2 + 3 - 4 = +1 > 0$: positive class, with margin 1 ✓.
- More confident at $(2, 1.5)$: its score magnitude is larger – distance from the boundary ✓.
- Unscaled index: its weight absorbs raw magnitude, the loss surface ravines (unit 13.5) – standardise before fitting ✓.

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