

4.3 Review Questions

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4.3.R1

1/1 point (graded)

Suppose we collect data for a group of students in a statistics class with variables X_1 = hours studied, X_2 = undergrad GPA, and Y = receive an A. We fit a logistic regression and produce estimated coefficients $\hat{\beta}_0 = -6$, $\hat{\beta}_1 = 0.05$, $\hat{\beta}_2 = 1$.

Estimate the probability that a student who studies for 40h and has an undergrad GPA of 3.5 gets an A in the class (within 0.01 accuracy):

✓ Answer: .3775

$$p(X) = \frac{e^{\beta_0 + \beta_1 X}}{1 + e^{\beta_0 + \beta_1 X}}$$


Explanation


We know that $P((40, 3.5)) = \frac{e^{-6 + .05 * 40 + 1 * 3.5}}{1 + e^{-6 + .05 * 40 + 1 * 3.5}} = .37554$

4.3.R2

1/1 point (graded)

How many hours would that student need to study to have a 50% chance of getting an A in the class?:

✓ Answer: 50

$$\log\left(\frac{p(X)}{1 - p(X)}\right) = \beta_0 + \beta_1 X.$$


Explanation

We have $P((h, 3.5)) = \frac{e^{-6 + .05 * h + 1 * 3.5}}{1 + e^{-6 + .05 * h + 1 * 3.5}} = .5$. Rearranging gives $-6 + .05 * h + 1 * 3.5 = 0$ or $h = 50$