Q2

▼ Q2

Q2. (Logistic Regression)
I surveyed the students who took CISC 484 last year and asked them about the number of hours they spent preparing for the final exam. Based on their answers and their grades in the exam, I used Logistic Regression to predict the probability of getting an A given the hours they spent in preparation. The resulting model had w0 = 0.32 and w1 = 1.2.

a. How does the odds of getting an A after studying for 6 hours compare with the odds of getting an A with 5 hours of study? (Hint. Consider the ratio between the two odds.)

b. What is the probability of getting an A after studying for 5 hours?

a. To compare the odds of getting an A after studying for 6 hours with the odds of getting an A with 5 hours of study, we can use the logistic regression formula:

$p(A = 1|x) = \frac{1}{1+e^{-(w_0+w_1*x)}}$

where x is the number of hours spent preparing for the final exam.

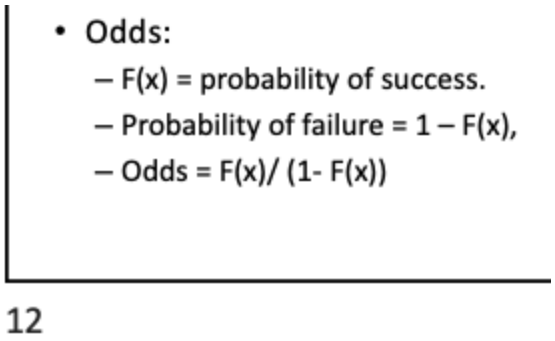
Using $x = 5$ and $x = 6$, we can calculate the probabilities of getting an A as follows:

$$p(A = 1|x = 5) =$$

$$p(A = 1|x = 6) =$$

The odds of getting an A after studying for 6 hours compared to 5 hours can be found by taking the ratio of the two probabilities:

see slide 12



$$\frac{odds(A=1|x=6)}{odds(A=1|x=5)} = \frac{\frac{p(A=1|x=6)}{1-p(A=1|x=6)}}{\frac{p(A=1|x=5)}{1-p(A=1|x=5)}} =$$

This means that the odds of getting an A after studying for 6 hours are 2 times higher than the odds of getting an A with 5 hours of study.

b. The probability of getting an A after studying for 5 hours can be calculated using the logistic regression formula as follows:

$$p(A=1|x=5) =$$