

**Quiz 8 – 4/19/2023**

**Instructions.** You have 15 minutes to complete this quiz. You may use your plebe-issue TI-36X Pro calculator. You may not use any other materials.

Show all your work. To receive full credit, your solutions must be completely correct, sufficiently justified, and easy to follow.

Problem	Weight	Score
1a	1	
1b	1	
1c	1	
1d	1	
1e	1	
Total		/ 50

**Problem 1.** In a study of 31 patients with esophageal cancer, researchers recorded the *Size* of the tumor (in cm) and whether the cancer had metastasized to the lymph nodes (*Metastasis* = 1 if yes, 0 if no). The researchers fit a logistic regression to predict the probability of metastasis based on the size of the tumor:

$$\log\left(\frac{\hat{\pi}}{1 - \hat{\pi}}\right) = -2.086 + 0.5117\text{Size} \quad \pi = P(\text{Metastasis} = 1)$$

- a. Use this fitted model to estimate the odds of metastasis, if a patient's tumor size is 4 cm.

Note that the problem asks for an estimate of the odds of metastasis, not the log(odds). See Example 3b in Lesson 27 for a similar example.

- b. Use this fitted model to estimate the probability of metastasis, if a patient's tumor size is 4 cm.

See Example 3c in Lesson 27 for a similar example.

c. Compute the odds ratio comparing the odds of metastasis for a 5 cm tumor versus a 4 cm tumor.

See Examples 3d or 3e in Lesson 27 for a similar example.

d. Interpret the odds ratio from part c in the context of the problem.

Be careful and specific! Using language such as “more likely” can refer to either probabilities or odds. If your interpretation involves odds specifically, you should say so.

See Example 3f in Lesson 27 for a similar example.

e. Sketch the curve of the probability form of the fitted model below.

