Name Jerry

Student Number _____

STA 312f2012 Quiz 4

The questions below refer to the following table from Problem 2.16 in the text.

Table 2.12. Data for Problem 2.16

	Lung Cancer	
Have Smoked	Cases	Controls
Yes	688	650
No	21	59
Total	709	709

1. (2 points) Identify the explanatory variable and the response variable in this study.

Have smoked is the explanatory variable. Lung cancer is the response variable.

2. (3 points) Is this study prospective, retrospective or cross-sectional? How can you tell *from the numbers in the table?* If you give the right answer but you do not back it up with evidence from the table, you get no marks.

It's retrospective. The equal sample sizes (709) for lung cancer cases and controls indicate that these people were selected according to cancer status, and then smoking was assessed. So the analysis is looking backward from response variable to explanatory variable

(It's okay if they remember from the HW question that case + controls were matched person-to-person, but they don't have to mention it.)

3. (5 points) Suppose that in this population, the overall probability of lung cancer is one percent. Using this information and the data in the table, estimate the probability of lung cancer given that the person is a smoker. Show your work. Your final answer is a single number. **Circle the number.**

$$P(C \mid S) = \frac{P(C \cap S)}{P(S)} = \frac{P(S \mid C)P(C)}{P(S)}$$

$$= \frac{P(S \mid C)P(C)}{P(S \mid C)P(C) + P(S \mid C^c)P(C^c)}$$

ESTIMATE WITH

$$\frac{688/709 \times 0.01}{688/709 \times 0.01 + \frac{650}{709} \times 0.99}$$

$$= \frac{0.9703808}{91.732015} = 0.0106$$

Rounding error is possible, no marks off