Scenario: Smoking and Lung Cancer

Instructions:

- View the video found on page 1 of this journal activity.

- Using the information provided in the video, answer the questions below.

- Show your work for all calculations.

The Student's Conjecture: Summarize what you know about the student's conjecture. What is she trying to determine? (**1 point**)

Conjecture
She is trying to determine if smoking and lung cancer are conditional. Do they influence each other?

The Data: Statistics about smoking and lung cancer for adults (age 18 and older) in the U.S:

- Researchers estimate that 21.5% of men and 17% of women smoke cigarettes. [1]

- The rate of new cases in 2008 showed that men develop lung cancer more often than women (70.2 and 50.5 cases per 100,000 persons, respectively). [2]

- Smoking, a main cause of small cell and non–small cell lung cancer, correlates to 90% and 80% of lung cancer deaths in men and women, respectively. [3] That is, 90% of men who are diagnosed with lung cancer are active smokers, and 80% of women who are diagnosed with lung cancer are active smokers.

Analyze the Conjecture:

1. What answer do you predict? Why? (**2 points**)

2. Given what you know about probability, how can you determine if smoking and lung cancer are related? (**2 points**)

Analyze the Data:

3. What is the probability that a randomly chosen man is a smoker? (**1 point**)

4. What is the probability that a randomly chosen man will be diagnosed with lung cancer? (**1 point**)

5. Given that a man has lung cancer, what is the probability that he is a smoker? Write this event with the correct conditional notation. (**2 points**)

6. What is the probability that a randomly selected man will be a smoker and be diagnosed with lung cancer? (**2 points**)

7. For a randomly selected man, are the events *diagnosed with lung cancer* and *smoker* independent events? Support your answer with probabilities. (**2 points**)

Consider the Case for Women:

8. For a randomly selected woman, are the events *diagnosed with lung cancer* and *smoker* independent or conditional? Support your answer with probabilities. (**4 points**)

Making a Decision:

9. What can you conclude about smoking and lung cancer? Are they conditional or independent events?
(**2 point**)

10. Some people who have never smoked develop lung cancer. Does this disprove the evidence? (**1 point**)