

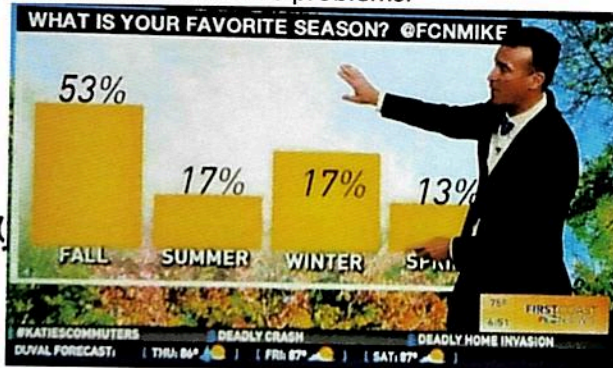
Instructions: Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. Explain what is wrong with the graph below. There are at least three problems.

Summer & winter bars are both 17%, but diff heights.

fall bar is not tall enough relative to winter bar given the % displayed.

axis titles?



2. Use the contingency table below to answer the probability questions that follow.

	Happy	Unhappy	
Developers	5	13	18
Mathematicians	7	10	17
	12	23	35

- a. What is the probability that someone selected randomly from this sample is a developer?

$$\frac{18}{35}$$

- b. What is the probability that someone selected randomly from this sample is happy?

$$\frac{12}{35}$$

- c. What is the probability that someone selected randomly from this sample is a happy developer?

$$\frac{5}{35}$$

- d. What is the probability that someone selected randomly from this sample is a developer or is happy?

$$\frac{18+12-5}{35} = \frac{25}{35}$$

- e. What is the probability that someone selected randomly from this sample is a developer given that they are happy?

$$\frac{5}{12}$$

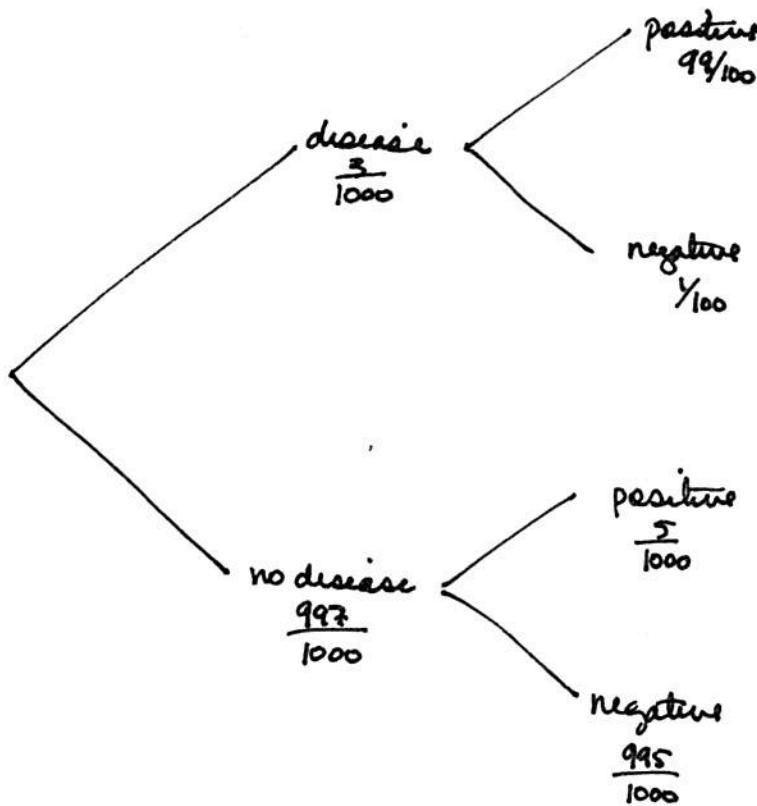
- f. Are happiness and being a developer independent events? Explain your reasoning. Show math to support your conclusion.

$$P(D) = 15/55$$

$$P(D|H) = 5/12$$

These are not equal, so they are dependent.

3. A particular rare disease occurs in just 3 out of 1000 people in population. A test for that disease correctly identifies those with the disease 99% of the time. For people without the disease, the test correctly identifies that they do not have the disease 99.5% of the time. If a patient tests positive for the disease, what is the probability that they actually have the disease?



$$P(\text{positive}) = \frac{3}{1000} * \frac{99}{100} + \frac{997}{1000} * \frac{5}{1000} = 0.007955$$

$$P(\text{disease} | \text{positive}) = \frac{\frac{3}{1000} * \frac{99}{100}}{P(\text{positive})} = 0.37335$$