This problem set covers material from Week 3, dates 2/23- 2/27. Textbook problems (if assigned) can be found at the end of the corresponding chapter.

Instructions: Write or type complete solutions to the following problems and submit answers to the corresponding Canvas assignment. Your solutions should be neatly-written, show all work and computations, include figures or graphs where appropriate, and include some written explanation of your method or process (enough that I can understand your reasoning without having to guess or make assumptions). A general rubric for homework problems appears on the final page of this assignment.

Monday 2/23

1. 2.60. Note that the term "prior probability" means the probability of disease without any other information. So if D represents the event of having the disease, then the prior probability is simply $P(D)$. *It will be very helpful to define events!*

Wednesday 2/25

2. 2.10
3. 2.37
4. 2.42

Friday 2/27

5. Independent Bernoulli trials are performed, with probability 3/4 of success. *In each of the following, define what your random variable represents, and don't forget the support!*
   (a) Suppose we perform the trials until we see one success. Find the PMF for the total number of trials performed.
   (b) Suppose we perform the trials until we have at least one failure and at least one success. Find the PMF for the total number of trials performed.
6. 3.20
7. 3.22 (a and b only)
8. Let $X \sim \text{DiscreteUnif}(C)$ where C is a finite set. Let B be a nonempty subset of C.
   (a) Find the *conditional PMF* of X given that X is in B. That is, define the function $P(X = x|X \in B)$ and specify a support. *Don't be scared! Remember, PMFs are probabilities so use your tools from conditional probability to find an expression for the conditional PMF!*
   (b) Verify that your conditional PMF is indeed a valid PMF.

General rubric

Points	Criteria
5	The solution is correct *and* well-written. The author leaves no doubt as to why the solution is valid.
4.5	The solution is well-written, and is correct except for some minor arithmetic or calculation mistake.
4	The solution is technically correct, but author has omitted some key justification for why the solution is valid. Alternatively, the solution is well-written, but is missing a small, but essential component.
3	The solution is well-written, but either overlooks a significant component of the problem or makes a significant mistake. Alternatively, in a multi-part problem, a majority of the solutions are correct and well-written, but one part is missing or is significantly incorrect.
2	The solution is either correct but not adequately written, or it is adequately written but overlooks a significant component of the problem or makes a significant mistake.
1	The solution is rudimentary, but contains some relevant ideas. Alternatively, the solution briefly indicates the correct answer, but provides no further justification.
0	Either the solution is missing entirely, or the author makes no non-trivial progress toward a solution (i.e. just writes the statement of the problem and/or restates given information).
Notes:	For problems with multiple parts, the score represents a holistic review of the entire problem. Additionally, half-points may be used if the solution falls between two point values above.