

4. In an arts community, 500 people are dancers and 9500 are not. Helena claims that dancers have a certain look to them and that she can tell who is a dancer, just from their appearance. When looking at a dancer, Helena correctly identifies them as dancers 90% of the time. When looking at anyone else, she correctly identifies them as non-dancers 98% of the time but mistakenly thinks they are dancers 2% of the time.
- (a) How many of the 500 dancers will Helena correctly identify as dancers?

 - (b) How many of the 9500 non-dancers will Helena mistakenly identify as dancers?

 - (c) How many people total will Helena think are dancers?

 - (d) What fraction of these people really are dancers?
5. You have a ten-sided die labeled with the digits from 0 to 9. If you kept rolling it (forever) and kept track of the digits, do you think that at some point you would see your phone number in the string of digits? Explain your reasoning.

6. We are asking embarrassing questions with the two-coin method. If someone sees heads-heads, then they lie; otherwise they tell the truth. There are 100 people in the room, and we ask, "Do you pay your bills on time?" Of these people, 65 of them say "yes" and 35 of them say "no." Explain why you know that 80 of the people pay their bills on time. [Hint: You do not need to solve the system of equations.]

7. Consider the following data: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233.

(a) What is the mean?

(b) What is the median?

(c) What is the mode?

8. (a) Find a list of five numbers where the mean is larger than the median.

(b) Find a list of five numbers where the median is larger than the mean.

9. (a) List the equally likely outcomes of flipping a penny, a nickel, and a dime.

(b) What is the probability of getting at least two heads?

(c) If you know that the dime is heads, what is the probability that you got at least two heads?

[Bonus: 3 points] How many times would you have to roll two fair dice in order for there to be at least a 0.5 chance that you will roll a seven?