1. Math review
   1. 0.0346
   2. {-2, -1, 1, 2}
   3. 91
   4. y = 2\*x + 3
   5. 7.39
2. Randomized control or observational study
   1. Flu vaccine – randomized controlled experiment because whether or not a patient is given the vaccine is the controlled variable.
   2. Support for same sex marriage – there is no controlled variable, only an observation. Therefore, observational study.
   3. Laptop ban – randomized controlled experiment because laptop or no laptop is a controlled variable.
   4. Support Elizabeth Warren – observational study because there is no controlled variable.
   5. Bacon and colorectal cancer – randomized controlled experiment because whether or not subject eats bacon is controlled variable.
3. The data does not prove that screening reduces women’s deaths from breast cancer because the differentiating variable is only whether or not the women agreed to a screening when offered. This control variable does not offer outright proof that screening reduces the rate of death from breast cancer, but it does support the claim that screening reduces the risk of death from breast cancer. Of the 10,800 who refused, 16 died (~0.15%) and of the 20,200 who accepted 23 died (~0.11%). To reiterate, this study merely supports the claim that in this specific data set the rate of death from breast cancer from those who accepted the screening is less than that of those who refused it. This does not translate to the universal claim that screening reduces women’s death from breast cancer.

Additionally, the data set is not explicitly randomized. Therefore, the study cannot be considered a randomized control study.

1. LGBT study
   1. I believe that this study was statistically biased. According to the study, less than 25% of the sample population identifies as Republican and more than 50% of the sample population identifies as Democratic. In my personal opinion, in the scope of LGBT topics of conversation, political preference has an impact on one’s stance. It is also true that the Amazon Mechanical Turk mechanism selected people who are more likely to be on the internet, such as younger Democratic leaning individuals. Regardless, given these factors I believe that there is no way to assert that the study is statistically unbiased.
   2. If I were given an ample budget to eliminate the bias in this study I would have to look for an alternate method of recruiting participants, maybe one that wouldn’t be more likely to recruit one of a certain political preference. It seems as if recruiting participants through the internet results in a younger more liberal population set so I would send out just as many paper versions of the survey to even the odds. This way, political preference would hopefully even out resulting in a more unbiased study.
2. 52 cards in a deck
   1. 52
   2. 52\*51 = 2652
   3. 52\*51/2 = 1326
   4. 2652
   5. 52\*52/2 = 1352 (assuming order does not matter b/c of the possibility of the same card being drawn twice)