FRQ #1 Modified 2003 AP Statistics Form B – Answer Key

1. This is an experiment since the health expert imposed treatments of vitamin C and placebo pill and the subjects were randomly assigned to the two treatment groups.
2. The probability that a randomly selected student contracted the flu is 633/808 = .783
3. Given that a student took vitamin C, the probability that they contracted the flu is 302/403 = .749
4. If P(flu| took vitamin C) = P(flu) then the two events are independent

302/403 $\ne $ 633/808

.749 $\ne $.783 therefore contracting the flu and taking vitamin C are NOT independent of each other.

1. Two sample Z Test for a difference of proportions

Ho: Pplacebo = Pvitamin C

Ha: Pplacebo > Pvitamin C

Pplacebo is the proportion of those receiving the placebo from the population of all students who would volunteer for such a study who contract the flu.

Pvitamin C is the proportion of those receiving vitamin C from the population of all students who would volunteer for such a study who contracted the flu.

1. Since our p value of 0.0096 is less than our assumed significance level $∝$ =.05, we reject the null hypothesis in favor of the alternative hypothesis. The health expert has convincing evidence that taking vitamin C does help to reduce the proportion of students like the ones in the study who contract the flu, compared to the placebo group.