Exercise 1

1. The bar chart shows that it doesn’t matter if defendants are black or whiter, the proportion of those who receive death penalty is much smaller than those who do not. Only by looking at the chart, it is hard to tell if death penalty is associated with defendants’ races.



(b) According to the chi-square test, the p-value is 0.2256, which is larger than .05, indicating that the there is no association between death and race of defendants.



According to the Fisher’s exact test, the two-sided p-value is 0.2578, which is also larger than .05, indicating that there’s no association between death and race of defendants.



The chi-square test and the exact test, although with different p-values, provide the same conclusion.

(c) The estimated risks for black defendants: 0.0785; for white defendants: 0.1097; total: 0.1009.

Risk difference: -0.0312.

The tables below show that there is no difference between the probability of black defendants receiving death penalty and that of white defendants, in that the 95% CL (-0.0784, 0.0161) of the difference between Row1 and Row 2 includes 0.



Exercise 2

(a) This bar chart is different from the previous one in that it indicates some potential racial inequity. When victims are white, and defendants are black, they are more likely to receive death penalty than otherwise, while if defendants are white, then they are more likely to avoid death penalty than not. However, if victims are black, then defendants of both races are more likely to avoid death penalty than not.



(b) When victims are black, the p-value of the chi-square test for the association between death and defendant is 0.4980, which is larger than .05, so we can conclude that there is no association between death penalty and race of defendants when victims are black.



When victims are black, the p-value of the Fisher’s exact test for the association between death and defendant is 1.00, which is larger than .05, so we can conclude that there is no association between death penalty and race of defendants when the victims are black.



When victims are white, the p-value of the chi-square test for the association between death and defendant is 0.0207, which is smaller than .05, so we can conclude that death penalty verdict is associated with race of defendants when victims are white.



When victims are white, the p-value of the Fisher’s exact test for the association between death and defendant is 0.0350, which is smaller than .05, so we can conclude that association death penalty verdict is associated with the race of defendants when the victims are white.



(c) The tables below show that when victims are white, the probability of black defendants receiving death penalty is not different from that of white defendants, in that the 95% CL of risk differences (-0.0067, 0.2380) incudes 0.





Exercise 3

(a) As is shown in the tables below, the p-value of the one-way ANOVA test is smaller than .05, which means that the cash offers in all three groups are not the same. This means that salesman’s age have an effect on cash offers.



(b) For homogeneity, we use Levene’s test, and because the p-value (0.5859) is larger than .05, we can conclude that the assumption of homogeneous variance is not violated. Therefore, no correction is needed.



(c) For pairwise tests on mean differences, we carry out Tukey’s test. As is shown in the table below, cash offers of the middle group are significantly higher than that of both elderly and young groups, while there is no significant difference between the young and elderly groups. Therefore, I would hire salesman from the middle group to sell my car.

