

Midterm 2017 key

Problem 1:

- a) $(999999/1000000)^{520}$
- b) $(3/100)*(2/99)*(1/98)$
- c) no, it's $1 - .98^{50}$ or the probability of not surviving all missions

Problem 2:

- a. It doesn't matter because the sample size is large
- b. At such a large sample size it doesn't matter
- c. A box with one ticket for each household with a number of TVs in house on ticket
- d. $1.86 \pm .06$ or $1.86 \pm 2*8/(\sqrt{750})$

Problem 3

- a) probably greater as the points are tightly clustered around a line of positive slope.
- b) You can't have negative numbers of searches, these data are in standard units.
- c) The correlation coefficient is invariant under scaling, so it would be the same.
- d) There is no obvious reason why there would be any relationship between these data points.

Problem 4

- a) State one assumption about the populations that you must make to construct a confidence interval.
Both White and Hispanic populations were sampled randomly.
- b) Compute the SE for each population.
SE for white males = $\sqrt{2/27}$
SE for Hispanic males = $\sqrt{1/27}$
- c) Compute the standard error of the difference between the means.
SE for difference = $\sqrt{((2+1)/27)} = \sqrt{1/9} = 1/3 = .333$
- d) Construct the 95% confidence interval.

$3 \pm .666$

e) What is the null hypothesis for this study?
That both populations have the same average opinion of the wall.

f) In this context, what does the confidence interval actually mean?
Given the null hypothesis there is less than a 5% chance a difference this large would be observed in a pair of randomly chosen samples.