Assignment 2 – JianghongMan

Jianghong Man

9/14/2020

Chapter 5

Question 1

a) 10/36 = 0.28

b) 6/36 = 0.17

Question 3

a) 2/13 = 0.15

b) 1

Question 5

P(6) = (9!/(6!3!)) * ((0.5)^6) * ((1-0.5)^(9-6)) = 0.164

Question 7

a) P = 1/8*3 = 0.375

b) P = 1-1/8 = 0.875

Question 9

a) P = (4/20 * 5/19) + (5/20 * 4/19) = 0.105

b) P = (10/20 * 1/19) + (1/20 * 10/19) = 0.053

Question 11

For this question, let X be the number of successful trials out of 60. Then, X ~ Binom(n,p) with n = 60, pi = 1/3.

mean = 60 / 3 = 20 sd = (60 * (1/3) * (1-1/3))^1/2 = 3.65

a) For this question, we should calculate: Required Probability= P(5<=X<=10) = P(X<=10)- P(X<5) = P(X<=10)- P(X<=4) = 0.003168 - 0.000001 =0.003167.

b) The probability that you will win at least 15 times is 0.937 (setting the calculator above 14.5)

c) The probability that you will win at least 40 times is almost 0 (setting the calculator above 39.5)

d) The most likely number of wins is 20 (the mode of distribution)

e) The probability of winning 20 times is 0.109 (setting the calculator between 19.5 and 20.5)

Question 15

False

Chapter 7

Question 2

a) The mean is 0 and the standard deviation is 1.

b) The mean would be 8 x 0 + 75= 75. The standard deviation would be 8 x 1 = 8.

Question 4

a) 0.68

b) 0.05

c) 0.088

Question 6

[58.785, 81.215]

Question 8

a) 0.2266 of drivers are less than or equal to the speed limit.

b) 0.0043 of drivers are going below 50 mph.

c) The new speed limit would be 81.252 mph.

d) It will be a positively skewed distribution instead of a a normal distribution.

Question 10

Since the normal distribution is continuous but the binomial distribution is discrete, we should calculate the probability of the range 6.5 - 7.5. In this case: mean = 12 * 0.5 = 6 variance = 12 * 0.5 * 0.5 = 3 standard deviation = 3 ^ 0.5 = 1.732 Thus, we insert those numbers to normal distribution calculator and see the area between 6.5 and 7.5 is 0.1932. Thus, the probability of getting exactly 7 heads is 0.1932 using normal distribution estimation.

Question 12

Normal approximation: 0.2037

Binomial: 0.2049

Question 22

```
AM_data <- read_excel("angry_moods.xls")
colnames(AM_data) <- c("Gender", "Sports", "Anger_Out", "Anger_In",
                       "Control_Out", "Control_In", "Anger_Expression")

mean(AM_data$Anger_Expression)
```

```
## [1] 37
```

```
sd(AM_data$Anger_Expression)
```

```
## [1] 12.94143
```

a) Mean = 37 and SD = 12.94
b) The table is shown below

```
table
```

```
##      Actual Normal Difference
## 25th  26.75  28.27       1.52
## 50th  36.00  37.00       1.00
## 75th  45.00  45.73       0.73
```

Chapter 9

Question 1

a) 50 and 1.5

b) 50 and 1.34

Question 3

standard error

Question 5

difference of mean = 1, standard error = 0.612, probability = 0.207

Question 7

The shape of the relative frequency distribution of the means will be quite close to a normal distribution according to the central limit theorem.

Question 9

The shape of the sampling distribution of r is skewed: if the correlation is positive then the distribution will be negatively skewed (left skewed) and if the correlation is negative then the distribution will be positively skewed (right skewed). The shape depends on the size of the population correlation: as the correlation increases (in either the positive or negative direction), the skew becomes more pronounced. So, the greater the absolute value of the population correlation, the more pronounced the skew.

Question 11

sample mean = 120, standard error = 2.5, probability =0.0026

Question 13

difference of mean = 0.2, standard error = 0.1179

a) probability = 0.0055

b) probability = 0.0449

Question 15

The reason for converting from r to z' is that transforming r to z' makes it normally distributed with a known standard error.

Question 17

True

Question 19

False

Question 21

True

Question 23

```
am_2 <- AM_data %>% group_by(AM_data$Gender) %>% summarize(count = n())
am_2
```

```
## # A tibble: 2 x 2
##   `AM_data$Gender` count
##              <dbl> <int>
## 1                1    30
## 2                2    48
```

men = 30, women = 48

Question 25

a) 2

b) 1.041

c) 0.1237

```r
aggregate(x = AM_data$Anger_Out,
          by = list(AM_data$Gender),
          FUN = mean)
```

```
##   Group.1        x
## 1       1 16.56667
## 2       2 15.77083
```

mean difference between men and women = 0.79584

Thus, the probability of c) is 0.1237.