Statistical Inference - Data Science - Quiz 2 - Coursera

Statistical Inference Quiz 2

This is Quiz 2 from the Statistical Inference course in the Data Science Specialization from John's Hopkins.

Questions

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1. CWhat is the variance of the distribution of the average an IID draw of n observations from a population with mean μ and variance σ2.

- **σ2/n**

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2. Suppose that diastolic blood pressures (DBPs) for men aged 35-44 are normally distributed with a mean of 80 (mm Hg) and a standard deviation of 10. About what is the probability that a random 35-44 year old has a DBP less than 70?

- **16%**

```
pnorm(70, mean = 80, sd = 10)
## [1] 0.1586553
```

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3. Brain volume for adult women is normally distributed with a mean of about 1,100 cc for women with a standard deviation of 75 cc. What brain volume represents the 95th percentile?

- **approximately 1223**

```
qnorm(0.95, mean = 1100, sd = 75)

## [1] 1223.364
```

4. Refer to the previous question. Brain volume for adult women is about 1,100 cc for women with a standard deviation of 75 cc. Consider the sample mean of 100 random adult women from this population. What is the 95th percentile of the distribution of that sample mean?

- **approximately 1112 cc**

```
qnorm(0.95, mean = 1100, sd = 75/sqrt(100))

## [1] 1112.336
```

5. You flip a fair coin 5 times, about what's the probability of getting 4 or 5 heads?

- **19%**

```
#Probability of being stricly greater than 3 heads (4 or 5)
pbinom(3, size = 5, prob = 0.5, lower.tail = FALSE)

## [1] 0.1875
```

6. The respiratory disturbance index (RDI), a measure of sleep disturbance, for a specific population has a mean of 15 (sleep events per hour) and a standard deviation of 10. They are not normally distributed. Give your best estimate of the probability that a sample mean RDI of 100 people is between 14 and 16 events per hour?

- **68% (within 1 sd)**

```
pnorm(16, mean = 15, sd = 1) - pnorm(14, mean = 15, sd = 1)
## [1] 0.6826895
```

7. Consider a standard uniform density. The mean for this density is .5 and the variance is 1 / 12. You sample 1,000 observations from this distribution and take the sample mean, what value would you expect it to be near?

- **0.5**

```
x <- rnorm(1000,mean=.5,sd=sqrt(1/12))
mean(x)
## [1] 0.4846762
```

8. The number of people showing up at a bus stop is assumed to be Poisson with a mean of 5 people per hour. You watch the bus stop for 3 hours. About what's the probability of viewing 10 or fewer people?

- **0.12**

```
ppois(10,15,lower.tail = TRUE)
## [1] 0.1184644
```