# AP Statistics

## 2019-03-05 7.3 Assignment

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Pg. 454-456 49,51,53,55,57,59,61,63,65-68

Question 49

μ[^p] = μ[¯x] = p = 225 seconds

The mean of the sample distribution is equal to the paramter.

stddev[¯x] = stddev[p]/sqrt(10) = 60 sec/sqrt(10) = 18.97 sec

Question 51

stddev[¯x] = 30 sec = 60 sec/sqrt(n)

n = 4

Question 53

Part A

The population is normal, therefore, the sample is normal.

The sampling distribution mean is the same as the parameter and population's mean, so μ[¯x] = μ[p] = 188 mg/dl

stddev[¯x] = stddev[p]/sqrt(n) = 41 mg/dl/sqrt(100) = 4.1 mg/dl

Part B

stddev[¯x] = 4.1 mg/dl.

z[lower] = (185 - 188)/4.1 = -0.73

z[upper] = (191 - 188)/4.1 = 0.73

P(¯x = 188 mg/dl ± 3) = normalcdf(z[lower], z[upper], 0, 1) = 0.5346

Part C

stddev[¯x'] = stddev[p]/sqrt(n) = 1.297 mg/dl

z[lower] = (185 - 188)/1.297 = -2.31

z[upper] = (191 - 188)/1.297 = 2.31

P(¯x' = 188 mg/dl ± 3) = normalcdf(z[lower], z[upper], 0, 1) = 0.9791

The larger sample is better as it is significantly more likely to match the population's mean.

Question 55

Part A

z = (295 - 298)/3 = -1

P(x < 295) = normalcdf(-∞, -1, 0, 1) = 0.1587

Part B

stddev[¯x] = stddev[p]/sqrt(6) = 1.225

z = (295 - 298)/1.225 = -2.45

P = 0.0071

Question 57

We do not know that as the sample could be too low for the CLT to apply or that the population distribution itself is normal.

Question 59

Part A

The CLT requires at least 30 songs.

Part B

The CLT allows us to represent the sampling distribution with a normal curve as long as N ≥ 30. This condition is met.

stddev[¯x] = 60/sqrt(36) = 10

z = (240-225)/10 = 1.5

P(z > 1.5) = 0.0668

Question 61

Part A

This cannot be calculated because the distribution of the population is not normally distributed.

Part B

n ≥ 30, so the CLT applies for ∑x for a full plane of 30 passengers.

6000 pounds across 30 passengers requires the mean of each to be at least 200 lbs

stddev[x] = 35 lbs/sqrt(30) = 6.390

z = (200 lbs - 190 lbs)/6.390 = 1.56

P(z > 1.56) = 0.0594

Question 63

The CLT applies (n ≥ 30), so x is normally distributed.

stddev[x] = 300/sqrt(10000) = 3

z = (275 - 250)/3 = 8.33

P(z > 8.33) = 0.0001

The company can safely sell these policies as the probability of an overall loss is 0.0001.

Question 65: **A**

Question 66: **C**

Question 67: **B**

Question 68: **D**