**DA\_RQ\_3 – Quiz 3 Solutions**

1. The household income distribution of a gated community should have a **lower (A)** standard deviation than a random sample of the whole population

* The difference in a gated community is typically very similar (which **will create a lower variation** **(meaning smaller standard deviation = less range)**). Compared to a random sample of the population where the data can differ by a **LARGE** amount meaning **larger standard deviation**. Making the standard deviation **BIGGER** (**more range/how spread out the data is**).

1. The Graduation Rate distribution among different colleges should have a **higher (B)** kurtosis than the average height distribution among different colleges.

– Graduation Rate has more variation (so **kurtosis > 3 - means more outliers**) compared to height since the average height will be the peak of a kurtosis distribution with a **lower peak**. This is because students may not graduate or take over 4 years to graduate.

Standard Deviation of X:

(2 + 3 + 8 + -1 + 1) / 5 = 2.6 = mean

X mean X - mean (X - mean)^2

2 2.6 -.6 .36

3 2.6 .4 .16

8 2.6 5.4 29.16

-1 2.6 -3.6 12.96

1 2.6 -1.6 2.56

SQRT ((.36 + .16 + 29.16 + 12.96 + 2.56) / 5) = SQRT (9.04) = 3.0067

**σx = 3.0067**

Standard Deviation of Y:

(5 + 6 + 10 + 0 + 3) / 5 = 4.8 = mean

Y mean Y - mean (Y - mean)^2

5 4.8 .2 .04

6 4.8 1.2 1.44

10 4.8 5.2 27.04

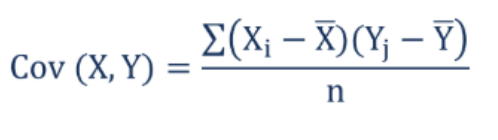
0 4.8 -4.8 23.04

3 4.8 -1.8 3.24

SQRT ((.04 + 1.44 + 27.04 + 23.04 + 3.24) / 5) = SQRT (10.96) = 3.3106

**σy = 3.3106**

Covariance between X and Y:



**(From table above)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Xi | Xi – Xu | Yi | Yi – Yu | (Xi – Xu)( Yi – Yu) |
| 2 | -.6 | 5 | .2 | -.12 |
| 3 | .4 | 6 | 1.2 | .48 |
| 8 | 6.4 | 10 | 5.2 | 28.08 |
| -1 | -3.6 | 0 | -4.8 | 17.28 |
| 1 | -1.6 | 3 | -1.8 | 2.88 |

48.6 / 5 = 9.72

**Answer**: 9.72