

Answer on Question #50954 – Math – Statistics and Probability

Question

The New York City Housing and Vacancy Survey showed a total of 59,324 rent controlled housing units and 236,263 rent stabilized units built in 1947 or later. For these rental units the probability distributions for the number of persons living in the unit are given.

# of persons	Rent controlled	Rent stabilized
1	.61	.41
2	.27	.30
3	.07	.14
4	.04	.11
5	.01	.03
6	.00	.01

- what is the expected value of the number of persons living in rent-controlled units?
- what is the variance of the number of persons living in rent-controlled units?
- what is the standard deviation of the number of people living in rent-controlled units?
- what is the expected value of the number of people living in rent-stabilized units?
- what is the variance of the number of people living in rent-stabilized units?
- what is the standard deviation of the number of people living in rent-stabilized units?

Solution

a. The expected value of the number of persons living in rent-controlled units is given by $E(V_c) = 1*0.61 + 2*0.27 + 3*0.07 + 4*0.04 + 5*0.01 = 1.59$

b. The variance of the number of persons living in rent-controlled units is given by $\sigma_{V_c}^2 = ((1 - 1.59)^2 + (2 - 1.59)^2 + (3 - 1.59)^2 + (4 - 1.59)^2 + (5 - 1.59)^2 + (6 - 1.59)^2)/6 = 6.57$

c. The standard deviation of the number of people living in rent-controlled units is given by $\sigma_{V_c} = \sqrt{\sigma_{V_c}^2} = \sqrt{6.57} = 2.56$

d. The expected value of the number of people living in rent-stabilized units is given by $E(V_s) = 1*0.41 + 2*0.3 + 3*0.14 + 4*0.11 + 5*0.03 + 6*0.01 = 2.08$

e. The variance of the number of people living in rent-stabilized units is given by $\sigma_{V_s}^2 = ((1 - 2.08)^2 + (2 - 2.08)^2 + (3 - 2.08)^2 + (4 - 2.08)^2 + (5 - 2.08)^2 + (6 - 2.08)^2)/6 = 4.93$

f. The standard deviation of the number of people living in rent-stabilized units is given by $\sigma_{V_s} = \sqrt{\sigma_{V_s}^2} = \sqrt{4.93} = 2.22$