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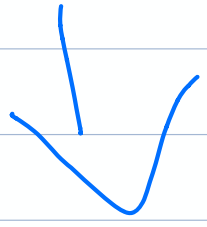
1. Question 1
    a. The expectation of a constant is that constant
    b. The expectation of a sum is the sum of their expectations
    c. Constant * expected value of the random variable
    d. 0
    e. If the variables are independent then it should be the sum of their variances
    f. The value of the constant squared * the variance of the variable
2. Question 2
    a. Population mean if known
    b. Sigma squared / n
        i. ^ meaning the variances of the samples divided by the number of values in the dataset
3. Question 3
    a.

See below for #3:



$$\hat{\beta}_1 =$$

$$\frac{\sum_{i=1}^{n} (Y(X_i - \bar{X}))}{\sum_{i=1}^{n} (X_i - \bar{X})^2} =$$

$$\frac{\sum_{i=1}^{n} Y \cdot \left(\sum_{i=1}^{n} (X_i - \bar{X})\right)}{\sum_{i=1}^{n} (X_i - \bar{X})^2}$$

$$\frac{}{}$$

$$-$$

$$\frac{\sum_{i=1}^{n} y \cdot 0}{\sum_{i=1}^{n} (x_i - \bar{x})^2}$$

$\sum_{i=1}^{n} (x_i - \bar{x})$

only sum of deviations are zero,

Squared sum is non-zero

$$= \frac{0}{\sum_{i=1}^{n} (x_i - \bar{x})^2} = 0$$

$$\hat{\beta}_0 = \bar{y} - \bar{x}\hat{\beta}_1 =$$

$$\bar{y} - 0 = \bar{y} =$$

Population mean y?