ASSIGNMENT 3

CCS226-18

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2BSCS-1

1. A SOAP FACTORY PRODUCES KOJIC SOAP BARS. THE AVERAGE WEIGHT OF THE BAR SOAP IS 50 G WITH STANDARD DEVIATION OF 3 G. THE SOAPS ARE PACKED IN BOXES CONTAINING 10 KOJIC BAR SOAPS. THE BOXES HAVE A MEAN WEIGHT OF 500 G WITH STANDARD DEVIATION OF 4 G.

A. FIND THE MEAN AND VARIANCE OF THE WEIGHT OF A FULL BOX.

Given:

μ of soap = 50g

σ of soap = 3g

μ of box = 500g

σ of box = 4g

n of soaps per box = 10

μ of full box = ?

σ^2 of full box= ?

mean weight of 10 soaps is

10 x 50g = 500g

the box alone weighs 500g so,

500g + 500g =1000g

mean weight of a full box is

1000g

since the standard dev of soap is 3g, its variance will be $9g^2$, but since we have 10 soaps in a box it will be

10 x 9g = $90g^2$

however, standard dev of the box only is 4g which will result to a variance of $16g^2$

Now, considering the box containing the soaps, it will be

Variance(10 soaps + box) = $90g^2$ + $16g^2$

Variance of a full box is

$106g^2$

B. IF THE SOAP FACTORY WILL PRODUCE A SPECIAL BATCH OF KOJIC SOAP BAR WHICH IS 3 TIMES HEAVIER, FIND THE MEAN AND VARIANCE OF THE SPECIAL BATCH.

Since mean weight of soaps is 3x heavier or became 150g,

10 x 150g = 1500g

the box alone still weighs 500g so,

1500g + 500g =2000g

mean weight of a full box of special box is **2000g**

since the standard dev of soap and box does not change,

the variance will still be

= **$106g^2$**