

Answer on Question #54703-Math-Statistics and Probability

A product is sold in a tin. The weight of the product is 500grams with a standard deviation of 5 grams; the weight of the tin is 100 grams with a standard deviation of 2 grams.

Find the probability that the contents of the tin will weigh:

- (a) less than 495 grams
- (b) more than 512 grams
- (c) between 495 grams and 512 grams

Find the probability that the tin and the contents will weigh:

- (d) less than 595 grams
- (e) exceed 610 grams

Solution

(a)

$$P(x < 495) = P\left(z < \frac{495 - 500}{5}\right) = P(z < -1) = 0.1587.$$

(b)

$$P(x > 512) = P\left(z < \frac{512 - 500}{5}\right) = 1 - P(z < 2.4) = 1 - 0.9918 = 0.0082.$$

(c)

$$P(495 < x < 512) = 1 - P(x > 512) - P(x < 495) = 1 - 0.0082 - 0.1587 = 0.8331.$$

(d)

The mean of the tin and the contents is $500 + 100 = 600$.

A standard deviation of the tin and the contents is $\sqrt{5^2 + 2^2} = \sqrt{29}$.

$$P(y < 595) = P\left(z < \frac{595 - 600}{\sqrt{29}}\right) = P(z < -0.93) = 0.1788.$$

(e)

$$P(y > 610) = P\left(z > \frac{610 - 600}{\sqrt{29}}\right) = 1 - P(z < 1.86) = 1 - 0.9686 = 0.0314.$$

