

Answer on Question #60350 – Math – Statistics and Probability

Question

Crispy Chips is a potato chip company that is quite popular for its low-fat, low-calorie bags of potato chips. The procedure used at its production plant allows for 65 chips to be inserted into each bag for distribution to consumers. However, given that chip-making is not an exact science, there is a standard deviation of 5 chips per individual bag. If we can assume that the amount of chips in each bag forms a normal distribution, calculate the following:

- a) Calculate the z-score if there are 75 chips in a bag.
- b) What is the probability that less than 61 potato chips will be in a bag?
- c) Determine the probability that more than 79 potato chips will be in a bag.
- d) Find the probability that there will be between 60 and 80 potato chips in a bag.

Solution

a) The z-score is

$$z(75) = (75 - 65)/5 = 2.$$

b) The z-score is

$$z(61) = (61 - 65)/5 = -0.8.$$

The probability that less than 61 potato chips will be in a bag is

$$P(X < 61) = P(z < -0.8) = 0.2119.$$

c) The z-score is

$$z(79) = (79 - 65)/5 = 2.8.$$

The probability that more than 79 potato chips will be in a bag is

$$P(X > 79) = P(z > 2.8) = 0.0026.$$

d) The z-scores are

$$z(60) = (60 - 65)/5 = -1; \quad z(80) = (80 - 65)/5 = 3.$$

The probability that there will be less than 60 potato chips in a bag is

$$P(X < 60) = P(z < -1) = 0.1587.$$

The probability that there will be less than 80 potato chips in a bag is

$$P(X < 80) = P(z < 3) = 0.9987.$$

The probability that there will be between 60 and 80 potato chips in a bag is

$$P(60 < X < 80) = P(-1 < z < 3) = P(z < 3) - P(z < -1) = 0.9987 - 0.1587 = 0.8400.$$

Answer: a) 2; b) 0.2119; c) 0.0026; d) 0.9987.