

Key for Short Problem Set 2

In SPS01 you worked with a data set consisting of 30 1.69-oz bags of M&Ms for which the number of yellow M&Ms were reported as

23 15 16 16 18 7 17 8 16 17 13 23 13 10 8
15 13 14 18 22 15 5 12 16 16 14 19 14 14 8

The experimental mean for this data set is 14.5 and the experimental standard deviation is 4.46. If we assume that these are good estimates for the true mean, μ , and the true standard deviation, σ , then what is the probability that the number of yellow M&Ms in a single random sample is:

1. between 16 and 23
2. greater than 17
3. less than 13

Answers

1. To find the probability for a result between 16 and 23, we first find the area to the right of 16 by calculating its value of z

$$z = \frac{16 - 14.5}{4.46} = 0.336$$

and use the probability table to get 36.8%, and then subtracting from this the area to right of 23, which from its value of z

$$z = \frac{23 - 14.5}{4.46} = 1.906$$

is 2.8%; thus, the net probability is $36.8\% - 2.8\% = 34.0\%$.

2. To find the probability of a result greater than 17, we find the area to the right of 17 by calculating its value of z

$$z = \frac{17 - 14.5}{4.46} = 0.561$$

and use the probability table to get 28.8%.

3. To find the probability of a result less than 13, we find the area to the left of 13 by calculating its value of z

$$z = \frac{13 - 14.5}{4.46} = -0.336$$

and use the probability table to get 36.8%.