

Answer on Question #55131 – Math – Statistics and Probability

Previous studies on some spherical seeds have revealed that their mean diameter is 10 mm with a standard deviation of 2 mm. We start with 1000 seeds and pass them through two sieves so that only seeds whose diameter is between 9.5mm and 10.5mm are left. Find out the following:

(i) How many such seeds will we get?

(ii) If we discard only those seeds with diameter less than 6 mm, then how many will be left?

Solution

(i)

$$\begin{aligned} P(9.5 < X < 10.5) &= P\left(\frac{9.5 - 10}{2} < Z < \frac{10.5 - 10}{2}\right) = P(-0.25 < Z < 0.25) \\ &= P(Z < 0.25) - P(Z < -0.25) = 0.5987 - 0.4013 = 0.1974. \end{aligned}$$

The number of seeds is

$$1000 \cdot 0.1974 = 197.$$

(ii)

$$P(X > 6) = P\left(Z > \frac{6 - 10}{2}\right) = P(Z > -2) = 1 - P(Z < -2) = 1 - 0.0228 = 0.9772.$$

The number of seeds is

$$1000 \cdot 0.9772 = 977.$$