Answer on Question #45576 – Math - Statistics and Probability

An X-ray technician is taking readings from his machine to ensure that it adheres to federal safety guidelines. He knows that the standard deviation of the amount of radiation emitted by the machine is 150 millirems but he wants to take readings until the standard error of the sampling distribution is no higher than 25 millirems. How many readings should he take?

Solution

The standard error of the sampling distribution is

$$SE = \frac{s}{\sqrt{n}},$$

where s is the standard deviation and n is the number of readings.

The standard error of the sampling distribution is no higher than 25 millirems:

$$SE = \frac{s}{\sqrt{n}} \leq 25 \to n \geq \left(\frac{s}{25}\right)^2 = \left(\frac{150}{25}\right)^2 = 36.$$

Answer: 36.