51307, Math, Statistics and Probability

Question The College Board reported the following mean scores for three parts of the Scholastic Aptitude Test (SAT): Critical Reading 502; Mathematics 515; Writing 494. Assume that the population standard deviation on each part of the test is 100. 1. For a random sample of 64 test takers, find the standard deviation of the sampling distribution of the sample mean. 2. For a random sample of 100 test takers, find the standard deviation of the sampling distribution of the sample mean.

Solution The standard deviation of the sampling distribution of a statistic is referred to as the standard error of that quantity. It can be found as

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

So for 1 we have

$$\sigma_{\bar{x}} = \frac{100}{\sqrt{64}} = \frac{100}{8} = 12.5$$

And for 2 we have

$$\sigma_{\bar{x}} = \frac{100}{\sqrt{100}} = \frac{100}{10} = 10$$