**CHAPTER 1: THE PURPOSE OF STATISTICS IN THE**

**CRIMINOLOGICAL SCIENCES**

**SOLUTIONS**

1. All U.S. prison inmates would be my population (the population would number in the several hundred thousands), while the 700 inmates that I actually studied would be my sample.
2. The average reading level of the 9.2nd grade is my population parameter and the average reading level I got from my sample of 700 inmates (9.6th grade) is my sample statistic.
3. I use my sample statistic to make an inference about the unknown population value. In this case and virtually every other instance we will not know the value of the population parameter. We take a sample from the population in order to get an estimate as to what that population parameter might be.
4. My population parameter is not usually known but it is usually knowable if we have the resources and time to study every member of the population. We usually do not have the resources or time to do this so we take a sample from the population.
5. The sample statistic will almost never be the exact value of the population parameter because we only have a small proportion of the population in our sample. If we took a second sample and calculated a sample statistic it would not likely be equal to the first sample statistic because we would have different elements in this second sample than we had in the first sample. This is called sample-to-sample variability or sampling error. Sampling error is the price we pay for taking a sample and not studying the entire population.
6. In order to increase the precision of my sample statistic (that is, in order to reduce sample-to-sample variability or sampling error), I can do two things: (a) take a larger rather than a smaller sample, (b) take a probability rather than a non-probability sample. Descriptive statistics usually only provide information about the sample under study without making any statements about the broader population. Inferential statistics use information from and about the sample to draw conclusions or inferences about what the population value should be based upon the sample statistics.
7. If I take a sample of 700 prison inmates and gave them a reading comprehension test and all I wanted was to know the average reading level of these 700, then I would be using descriptive statistics – a mean.
8. If it took a sample of 700 prison inmates and gave them a reading comprehension test and I wanted this information in order to estimate what the reading level was of all U.S. prison inmates then I would be using inferential statistics – again, a mean. In this case, however, I would be using my mean not to describe the reading level of my 700 inmates, but to make an inference about an unknown population parameter – the average reading level of all U.S. prison inmates.
9. If you use a sample statistic to make an inference about an unknown population parameter then a probability sample is better than a non-probability sample because it will allow you to make your estimate more precise and reduce sampling error.
10. The symbol for an unknown population mean is μ while the symbol for the sample mean is .
11. The symbol for an unknown population proportion is *P*, while the symbol for the sample statistic is *p*.