

Section 3.2 IRA Guide

Introduction

Screen 1: List of Objectives

Screen 2: Watch the video for Example 1 to understand why measures of central tendency are not sufficient for describing a data set.

Objective 1: Determine the Range of a Variable from Raw Data

Screen 1: Definition of range – a quick way to get an idea about the dispersion of a data set.

Screen 2: Example 2 shows how to compute the range of a set of data. There is also a discussion about whether the range is resistant.

Screen 3: This problem is based on Example 2. You can do this one by hand, or you can type the data into StatCrunch to find the range.

Objective 2: Determine the Standard Deviation of a Variable from Raw Data

Screen 1: Definition of **population standard deviation**, σ (sigma). The formula is different than the formula for the standard deviation of a sample and will produce different results. There is a link to a video that explains the formula that is worth watching even though we will be computing this using StatCrunch because it will help you to understand exactly what standard deviation measures.

Screen 2: Example 3 explains how to compute population standard deviation, which is labeled as “Unadj. Std Dev” on StatCrunch. Watch the StatCrunch solution video to learn how to find a median using StatCrunch.

Screen 3: This problem is based on Example 2 on the previous screen. You should open the data in StatCrunch to find the population standard deviation.

Screen 4: An explanation about how values that are “far” from the mean affect the standard deviation.

Screen 5: Definition and formula for **sample standard deviation**, s . There is a link to a video on this screen that goes over this formula and how it is different than population standard deviation.

Screen 6: Give a quick read about why we divide by $n - 1$ when working with sample standard deviation. The phrase “degrees of freedom” will return in Chapter 9. Check out the In Other Words video.

Screen 7: Example 4 shows how to find sample standard deviation. Watch the StatCrunch solution video.

Screen 8: This problem is based on Example 4 on the previous screen. You should open the data in StatCrunch to find the sample standard deviation.

Screen 9: Watch the video about standard deviation and resistance. Be sure you understand why standard deviation is not resistant.

Screen 10: Give this a good read so you understand how we can interpret standard deviation.

Screen 11: Example 5 shows how to compare the dispersion of two different data sets using standard deviation. Be sure to watch the video.

Screen 12: This problem is based on Example 5 on the previous screen. Be sure to import the data into StatCrunch to do all calculations.

Screen 13: Click the link to launch the activity about standard deviation. This will give you a better conceptual understanding of standard deviation and how it is affected by individual values.

Screen 14: This video summarizes key points from the activity on the previous screen.

Screen 15: This problem asks a question about a standard deviation of 0, which was covered in the activity and the video summary. **You only get one chance at this problem, so be sure you understand the concepts from the activity before trying the problem.**

Screen 16: This problem asks a question about the standard deviation and resistant measures. **You only get one chance at this problem, so be sure you understand the concept before trying the problem.**

Screen 17: This problem asks a question about whether the standard deviation can be negative. **You only get one chance at this problem, so be sure you understand the concept before trying the problem.**

Objective 3: Determine the Variance of a Variable from Raw Data

Screen 1: Definition of population variance and sample variance, which are related to standard deviation.

Screen 2: Example 6 goes over computing variance when the standard deviation is already known.

Screen 3: Watch the video to understand the two ways of computing variance as well as how the results may differ slightly.

Screen 4: This problem asks you to compute variance. You can use StatCrunch for these calculations. Unadj. Variance is population variance, while Variance is sample variance in StatCrunch.

Screen 5: This concept can be skipped

Objective 4: Use the Empirical Rule to Describe Data That Are Bell-Shaped

Screen 1: Explanation of the Empirical Rule for bell-shaped data. Click through all 3 bullet points. You should make note of the 3 percentages given – we will use those often.

Screen 2: Click through the figures to get a visual explanation of the Empirical Rule.

Screen 3: Example 7 shows how to use the Empirical Rule. Be sure to watch the solution video as we have to do these calculations by hand.

Screen 4: This problem is based on Example 7. Use the same approach as I used in the solution video.

Screen 5: End of Section