Section 7.1 IRA Summary

Introduction

Screen 1: Recall that a variable is discrete if it is countable (whole #'s only), and is continuous if it is measurable (decimals OK). [Section 1.1]

Screen 2: Empirical Rule – Start with a number line with the mean labeled at the center, put 3 marks to the left and 3 marks to the right. Add the standard deviation to the mean to get the 3 numbers to the right and subtract the standard deviation from the mean to get the 3 values to the left.
Suppose the mean was 100 and the standard deviation was 20. Mark 100 in the center of the line.
The 3 values to the right will be 120 (100+20), 140 (120+20), and 160 (140+20).
The 3 values to the left will be 80 (100-20), 60 (80-20), and 40 (60-20).
Those 7 values break up the number line into 8 intervals, and the percentage of values in those intervals are: 0.15%, 2.35%, 13.5%, 34%, 34%, 13.5%, 2.35%, 0.15%
Once your number line is set up you should be able to solve any problem by addition. [Section 3.2]

Screen 3: For a discrete probability distribution each probability must be between 0 & 1, and the total of all P(x)'s must be equal to 1. [Section 6.1]

Screen 4: List of Objectives

Objective 1: Use the Uniform Probability Distribution
You are not responsible for any of the material in Objective 1, so you can skip right to Objective 2.

Screen 1: A quick mention of the Uniform Probability Distribution. You will not be tested on this concept, and I have removed them from the HW. ***You can skip this.***

Screen 2: Example 1 goes over the Uniform Distribution. ***You can skip this.***

Screen 3: One of the most important concepts here is the fact that for a continuous random variable the probability of any specific value occurring is equal to 0. We can find probabilities for certain intervals of values though. Another important concept is that we use the area under a graph to represent probabilities.
The video explains how to solve uniform distribution probability problems.
This is done by multiplying the width of the interval by the height of the rectangle. (The height is always equal to 1/total width of possible values of x. If values of x can run from 0 to 30, the height of the rectangle is 1/30.) ***You can skip this.***

Screen 4: This problem is based on the video on the previous screen, but here is how you can work through this.
Part a: Determine how many minutes long the interval is, then multiply by the height of the rectangle. Your answer will be a fraction. Be sure to reduce to lowest terms.
Part b: Change the given probability from a percent to a decimal. Multiply that decimal by the reciprocal of the rectangle's height. For example, if the probability is 20% and the height of the rectangle is 1/25, you need to multiply 0.20(25/1). ***You can skip this.***

Objective 2: Graph a Normal Curve

Screen 1: This screen begins to explain the graph of a normal curve, which is also known as a bell curve.

Screen 2: More info on the concept of a variable that is normally distributed – a continuous random variable is normally distributed if its graph is bell shaped.

Screen 3: Explanation of how to graph a normal curve. The mean is located at the center. The inflection points are 1 standard deviation away from that. (Not important to us in the long run, just be sure you can roughly approximate this graph.)

Screen 4: Click on the link to start Activity 1. This activity will help you to understand how the mean (mu) and standard deviation (sigma) affect the shape of a normal curve.

Screen 5: This problem is based on the activity on the previous screen. You need to know how the mean and standard deviation affect the normal curve.
You only get one chance at this problem, so be sure you have worked through Activity 1 on the previous screen and completely understand the impact of the mean and standard deviation on the graph of the normal curve.

Screen 6: For this problem you need to know that the mean is located at the center of the curve, and the standard deviation is the distance between the mean and either of the inflection points.

Objective 3: State the Properties of the Normal Curve

Screen 1: This screen lists the 7 properties of the normal curve. If you click on the link to watch the video, those 7 properties are summarized there.

Screen 2: This problem will test your knowledge of the 7 properties of the normal curve that were listed on the previous screen.

Objective 4: Explain the Role of Area in the Normal Density Function

Screen 1: Watch the video to learn about the role of area when working with a normal random variable. I know this video is a little long (6 minutes) but I think it is important to watch this one.

Screen 2: Summary of the properties discussed in the video on the previous screen. There are two interpretations of area presented.

Screen 3: This example (Example 2) shows how to draw a normal curve and shade the appropriate region. It also goes over how to interpret the area under the curve. Be sure to watch the By Hand video solution. [In general, we will not be told what the area is. We will learn how to use StatCrunch to find it in Section 7.2.]

Screen 4: This problem is based on Example 2 on the previous screen.

Screen 5: This problem asks you to interpret area under the normal curve. Again, this is similar to what was covered in Example 2.

Screen 6: End of Section