

## Section 5.5 IRA

### *Introduction*

Screen 1: List of Objectives

### ***Objective 1: Solve Counting Problems Using the Multiplication Rule***

Screen 1: Introduction to Counting

Screen 2: Example 1 shows how to use a tree diagram to count possible outcomes. Be sure to watch the video.

Screen 3: Multiplication Rule of Counting, which is based on the results of Example 1.

Screen 4: Example 2 shows how to use the Multiplication Rule. Be sure to watch the video solution.

Screen 5: Example 3 shows how to use the Multiplication Rule when repetition of choices is not allowed. Be sure to watch the video solution.

Screen 6: This problem is based on Example 2.

Screen 7: This screen explains the concept of a factorial.  $n!$  is the product of all the integers between  $n$  and 1. Your calculator should have a button for computing factorials.

Screen 8: Example 4's video shows how to use and compute factorials.

Screen 9: This problem covers the computation of factorials. If you click on Question Help, and then on Tech Help, you will see directions for computing factorials in StatCrunch as well as the TI-84 calculator.

Screen 10: This problem is based on Example 4.

### ***Objective 2: Solve Counting Problems Using Permutations***

Screen 1: Definition of a Permutation

Screen 2: Development of the formula for computing the number of permutations  $nPr$ . By the way, you can always do this with StatCrunch or your calculator, so being able to use the formula is not that important.

Screen 3: Example 5 shows how to compute permutations. Be sure to watch the StatCrunch video (& maybe the TI-84 video) to see how to use technology for these calculations.

Screen 4: This problem focuses on computing  $nPr$ , as shown in Example 5.

Screen 5: Example 6 gives an applied problem for computing  $nPr$ . Be sure to watch the StatCrunch video.

Screen 6: This problem is based on Example 6, finding  $nPr$  for an applied problem.

***Objective 3: Solve Counting Problems Using Combinations***

Screen 1: Definition of Combinations  $nCr$  – Similar to permutations, but the order of selection does not matter.

Screen 2: Example 7 explains how to list all possible combinations. Be sure to watch the video solution.

Screen 3: Derivation of the formula for the number of combinations  $nCr$ .

Screen 4: Example 8 shows how to compute  $nCr$ . Be sure to watch the StatCrunch video. If you choose to do these on your calculator, watch the TI-84 video as well. You should also look at the Technology Step-By-Step document.

Screen 5: This problem is based on Example 8.

Screen 6: Example 9 is an applied problem that computes  $nCr$ . Again, be sure to watch the video solution.

Screen 7: This problem is based on Example 9.

***Objective 4: Solve Counting Problems Involving Permutations with Nondistinct Items***

Screen 1: This video example (Ex 10) shows how to count when there are nondistinct items.

Screen 2: Development of the formula for the number of permutations with nondistinct items

Screen 3: Example 11 is an applied problem for computing the number of permutations with nondistinct items.

Screen 4: This problem is based on Example 11.

Screen 5: This is a summary of Combinations and Permutations, which is very important.

***Objective 5: Compute Probabilities Involving Permutations and Combinations***

Screen 1: Introduction to computing probabilities involving combinations and permutations. If this technique makes more sense to you, you can use it as an alternative to finding probabilities using multiplication. Note – you will not be forced to use this method.

Screen 2: Example 12 uses combinations to find the probability of winning the lottery. Be sure to watch the StatCrunch video, and/or the By Hand video.

Screen 3: Example 13 goes over another example of how to find probabilities by using combinations. Again, be sure to watch the StatCrunch and/or By Hand video solutions.

Screen 4: This problem is based on Examples 12 & 13. When you try Part (c) you can see the advantage of using combinations over multiplication for finding probabilities.

Screen 5: End of Section