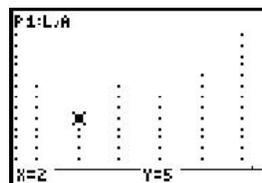
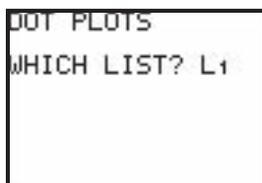


# Statistical Reasoning: Investigating a Claim of Discrimination

## Calculator Note 1A: Dot Plots

The TI-83 Plus and TI-84 Plus do not have the built-in capability to produce dot plots. For small to medium data sets, you can use the program DOTPLOTS. Before running the program, enter your data into any list on your calculator (L1 to L6 or any user-defined list). Press **PRGM**, select DOTPLOTS from the EXEC menu, and press **ENTER**. At the prompt, enter the name of the list that contains your data and press **ENTER**. (Press **2ND** [LIST] to select user-defined lists from the NAMES menu.) The calculator will show a dot plot on the Graph screen. You can press **TRACE** to see the value of each dot and to count the number of dots in each column.



See Calculator Note 0J for more information about programs. If you are manually entering this program, refer to your calculator's *Graphing Calculator Guidebook* for information about programming code.

```

PROGRAM:DOTPLOTS
ClrHome:FnOff :PlotsOff
Disp "DOT PLOTS"
Disp ""
Input "WHICH LIST? ",LL
Disp ""
Disp "PROCESSING..."
dim(LL)→dim(LA)
SortA(LL)
1→LA(1)
For(I,2,dim(LL),1)
If LL(I)≠LL(I-1)
Then
LA(I-1)+1→LA(I)
Goto A
End
1→LA(I)
Goto B
Lbl A
End
Lbl B
End
Plot1(Scatter,LL,LA,·)
ZoomStat

```

## Calculator Note 1B: Modeling a Chance Process (Activity 1.2a)

Activity 1.2a should be performed as directed in the text. Performing this activity as a concrete simulation—physically drawing random index cards—gives you invaluable insight into the process of simulation.

After you have done the concrete simulation, you may want to repeat the activity using a calculator. Doing so reinforces the results of the concrete simulation. The four-step process that is outlined here is consistent with the AP Statistics

Exam's requirements for simulations. You can apply this four-step process to any simulation—using concrete objects, using random number tables, or using technology.

**a. Assignment of Code Numbers**

Code each of the ages using a reasonable scheme. For example, you may choose to assign the integers 1 through 10 to the respective ages of the employees.

<b>Digit</b>	1	2	3	4	5	6	7	8	9	10
<b>Age</b>	25	33	35	38	48	55	55	55	56	64

Now, with a TI-83 Plus or TI-84 Plus, use the `randInt(` command to select one of the code digits. Find this command by pressing `[MATH]`, arrowing over to `PRB`, and selecting `5:randInt(`. The syntax of the command is `randInt(start, end, n)`, so it will select  $n$  random integers from the closed interval  $[start, end]$ .

**b. Address the Issue of a Selection of Duplicate Code Numbers**

In the concrete simulation, once a card is selected it is not returned, guaranteeing that an employee cannot be selected a second time. Therefore, in this simulation, duplicates are not allowed.

Unfortunately, on the TI-83 Plus and TI-84 Plus, random number generators sample with replacement. Therefore, if you execute `randInt(1,10,3)`, you might not select three unique values. One solution is to generate more integers than are required. For example, `randInt(1,10,6)` generates six random integers, from which you will choose the first three unique values.

```
randInt(1,10,6)
(10 10 2 6 5 8)
```

In this screen, you select code numbers 10, 2, and 6, corresponding to the ages 64, 33, and 55. The duplicate 10 is ignored.

**c. Stopping Rule**

State a rule that indicates when the simulation is completed. In Activity 1.2a, each trial consists of three selections and the simulation continues for ten trials.

**d. Result**

You should clearly indicate the result of the simulation.

There are, of course, programs and applications that will perform simulations without replacement. If time allows, you may want to search for these alternatives.

### Calculator Note 1C: Combinations $nCr$

To find numbers of combinations, use the  $nCr$  command. To find the  $nCr$  command, press **MATH**, arrow over to PRB, and select 3: $nCr$ . First enter the value of  $n$ , the number of objects. Then enter the  $nCr$  command, and then enter the value of  $r$ , the number of objects chosen. Then press **ENTER**.

For example, to find the number of groupings of 10 objects chosen 3 at a time, enter 10  $nCr$  3. The answer shows that there are 120 different groupings.

```
MATH NUM CPX PRB
1:rand
2:nPr
3:nCr
4:!
5:randInt(
6:randNorm(
7:randBin(
```

```
10 nCr 3
120
```