

## Home Land Security PreCalculus or Statistics

Name \_\_\_\_\_

Date \_\_\_\_\_

Suppose at Kennedy Airport in New York, one of every seven passenger's luggage is searched. The computer picks who is to be searched at random. If you are traveling in a party of 20, what is the probability your luggage will be searched?

1. What type of procedure will be used?
2. Verify the situation meets the Conditions.
  - a.
  - b.
  - c.
  - d.
3. What is the probability that two people in your party will be searched?
4. What is the probability that at least three people in your party will be searched?
5. What is the probability that more than three people in your party will be searched?
6. What is the probability that no one in your party is searched, but the next person in line is?
7. For the party of 20, what is the
  - a. mean
  - b. variance
  - c. standard deviation
8. Suppose there are 50 passengers in line for your flight. Perform a simulation to estimate how many could be stopped.
  - a. On the TI-Nspire, create a new document, open a calculator page.  
Type "RandBin( 50,1/7)" [enter].  
Based on your simulation, how many passengers were stopped? \_\_\_\_\_
  - b. Will your answer be the same as your neighbors? \_\_\_\_ Why? \_\_\_\_\_
  - c. Cursor up twice, [enter][enter] and record your new number \_\_\_\_\_
  - d. Is it the same as before? \_\_\_\_\_ Why or why not? \_\_\_\_\_
9. Since we will not always get the same number of searches, we need to simulate a large number of flights. Add a "List & Data" page on your TI-Nspire. In the title cell for column A, type "searches." In the diamond row of column A (grey) type=RandBin(50,1/7,200). This will simulate 200 flights with 50 passengers each. The cells from 1 to 200 of column A will contain the results.
10. To determine the proportion of passengers stopped for a search, we divide the number searched by the size of the group (50). Change the formula in Column A of the "Diamond Row" to RandBin(50,1/7,200.)/50. To get the answer as a decimal, be sure to include the decimal point after 200.

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11. To compute a mean and standard deviation; go back to the "Calculator" page and select:
    - a. Menu
      - i. Statistics
        1. Stat Calculation
          - a. One-Variable Statistics
            - i. One list, [OK] [enter]
            - ii. X1 list is "Searches" [OK]
          - b. Record the mean (-) and standard deviation ( $s_x$ ) \_\_\_\_\_, \_\_\_\_\_.
12. To see a graphical representation, add a "Data and Statistics" page. Click at the bottom and select "searches" for the x variable. Describe the dot plot you observe. \_\_\_\_\_

13. What impact will changing the number of people in the group have? To discover the answer, let's simulate different sizes of groups. NOTE: The number of simulations stays the same. Let's try a smaller group first, say of 25. To make the changes easier, we are going to enter the group size in "B1". Then we are going to change the formula in Column A to  $\text{RandBin}(B1, 1/7, 200.) / B1$

**Fill in the table below:**

Party Size	$s_x$	$\sigma = \sqrt{p(1-p)/n}$
25		
50		
75		
100		
500		
1000		

14. Make a scatter plot of  $S_p$  vs.  $\sigma$ . Describe what you see. \_\_\_\_\_
15. Find the LSRL equation (also called line of best fit.) \_\_\_\_\_
16. How many passengers would have to be stopped for you to disbelieve Home Land Security's claim? \_\_\_\_\_