TI-84 family Graphing Calculator Skills for Statistics
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1. Descriptive Statistics and Graphical displays

Researchers want to see whether training increases the capability of people to correctly predict outcomes of coin tosses. Each of twenty people is asked to predict the outcome (heads or tails) of 100 independent tosses of a fair coin. After training, they are retested with a new set of 100 tosses. (All 40 sets of 100 tosses are independently generated.) Since the coin is fair, the probability of a correct guess by chance is 0.5 on each toss. The numbers correct for each of the 20 people were as follows.

Score Before Training (number correct)	Score After Training (number correct)
46	61
48	62
50	53
54	46
54	50
54	52
54	53
54	59
54	60
54	61
55	55
56	59
57	55
58	50
58	56
61	58
61	64
63	57
64	61
65	54

Do the data suggest that after training people can correctly predict coin toss outcomes better than the 50 percent expected by chance guessing alone?

NOTE: When given data, students need to justify that the assumptions for a statistical test are met. In this case, the data needs to be approximately normal. Students may enter the data and graph it. In addition, they can use the built-in features to find the information that they will need to draw a conclusion. The calculator can be used for steps 2 and 3 in the four step process. Students still need to check the conditions for the test/interval and draw the conclusion.

NORMAL FLOAT AUTO REAL RADIAN MP

PRO	BEF	AFT	DIF	------	12
0.15	46	61	15		
0.21	48	62	14		
0.4	50	53	3		
0.24	54	46	-8		
------	54	50	-4		
	54	52	-2		
	54	53	-1		
	54	59	5		
	54	60	6		
	54	61	7		
	55	55	0		

Name=

NORMAL FLOAT AUTO REAL RADIAN MP

Plot1 Plot2 Plot3

Off

Type:

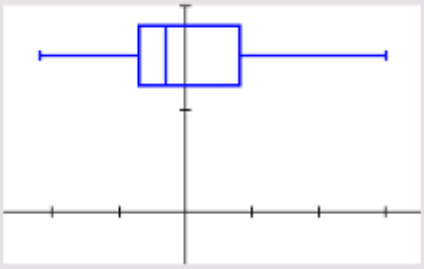
Xlist:DIF

Freq :1

Mark :

Color: BLUE

NORMAL FLOAT AUTO REAL RADIAN MP



NORMAL FLOAT AUTO REAL RADIAN MP

T-Test

Inpt:Data Stats

μ_0:0

List:DIF

Freq:1

μ:$\neq\mu_0$ $<\mu_0$ $>\mu_0$

Color: BLUE

Calculate Draw

NORMAL FLOAT AUTO REAL RADIAN MP

T-Test

$\mu>0$

t=0.196226505

p=0.4232582168

$\bar{x}$=0.3

Sx=6.837204723

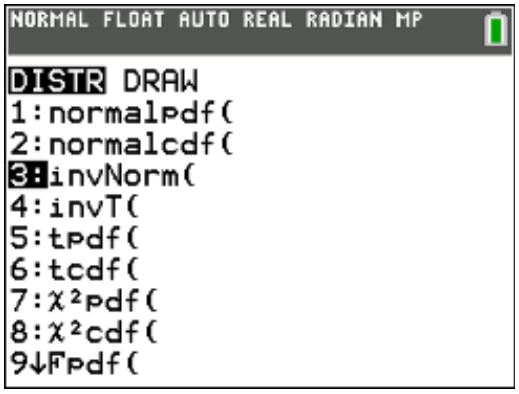
n=20

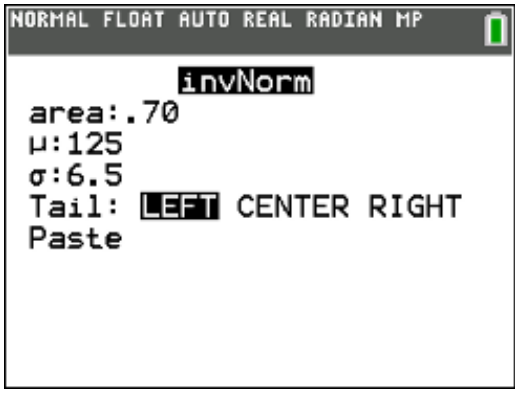
2. Distributions (Normal, Binomial, Geometric)

2009 AP® STATISTICS FREE-RESPONSE QUESTIONS

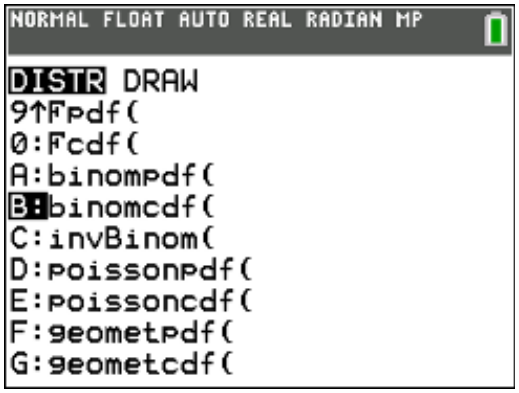
2. A tire manufacturer designed a new tread pattern for its all-weather tires. Repeated tests were conducted on cars of approximately the same weight traveling at 60 miles per hour. The tests showed that the new tread pattern enables the cars to stop completely in an average distance of 125 feet with a standard deviation of 6.5 feet and that the stopping distances are approximately normally distributed.

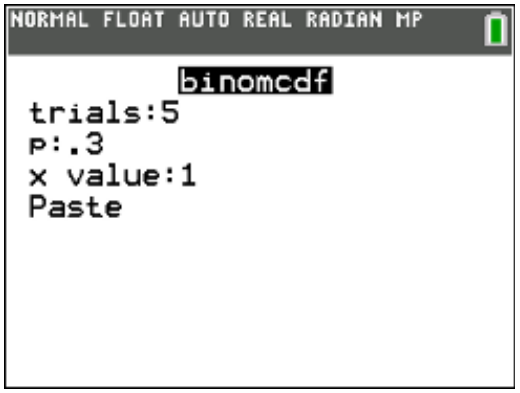
(a) What is the 70th percentile of the distribution of stopping distances?





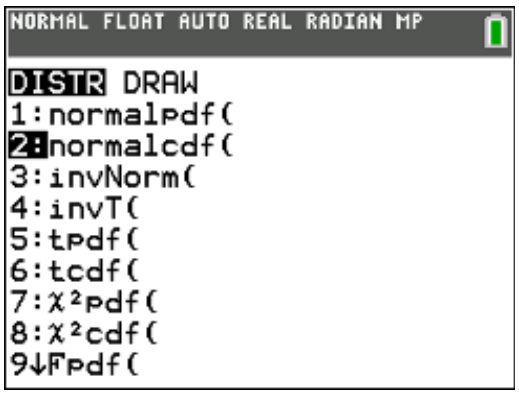
(b) What is the probability that at least 2 cars out of 5 randomly selected cars in the study will stop in a distance that is greater than the distance calculated in part (a) ?

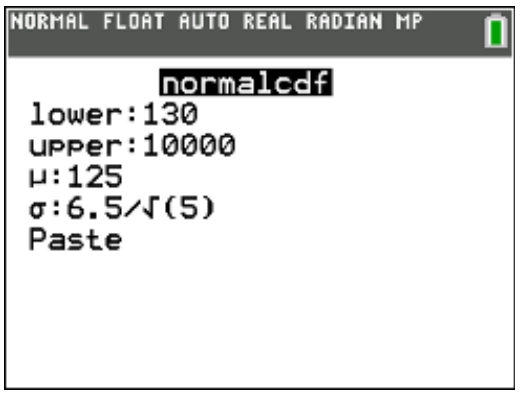




NOTE: Binomcdf finds the probability from x=0 to the value given in the command. Thus, for this problem, a student must calculate 1 – binomcdf(5,0.3,1).

(c) What is the probability that a randomly selected sample of 5 cars in the study will have a mean stopping distance of at least 130 feet?





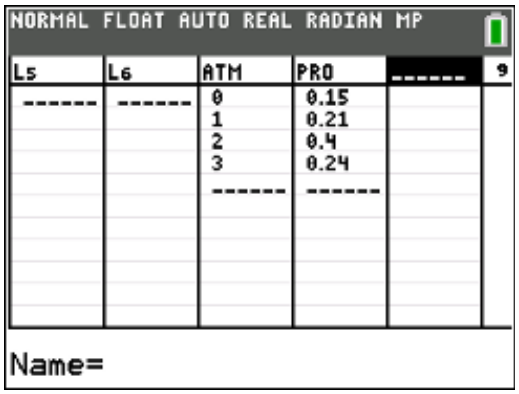
3. Discrete random variables

2015 AP® STATISTICS FREE-RESPONSE QUESTIONS

3. A shopping mall has three automated teller machines (ATMs). Because the machines receive heavy use, they sometimes stop working and need to be repaired. Let the random variable X represent the number of ATMs that are working when the mall opens on a randomly selected day. The table shows the probability distribution of X.

Number of ATMs working when the mall opens	0	1	2	3
Probability	0.15	0.21	0.40	0.24

(b) What is the expected value of the number of ATMs that are working when the mall opens?



NOTE: This will give the mean and standard deviation for the discrete probability distribution.

Additional lists can be created (and named) by first moving the cursor to the right of L6. Arrow to the top of the column and using the ALPHA key, type name (up to 3 letters) for the list. The list can then be used on other screens (graphing and calculator) through 2nd LIST & NAMES,

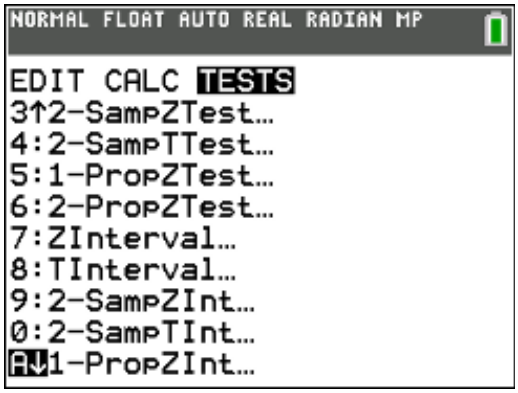
4. Inferential statistics – all tests and confidence intervals are found using stat > tests

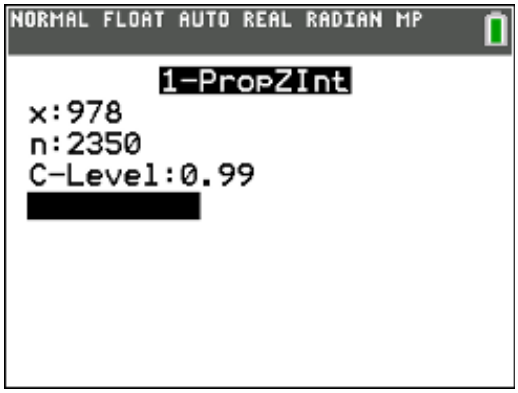
    a. Confidence Interval

2011 AP® STATISTICS FREE-RESPONSE QUESTIONS (Form B)

5. During a flu vaccine shortage in the United States, it was believed that 45 percent of vaccine-eligible people received flu vaccine. The results of a survey given to a random sample of 2,350 vaccine-eligible people indicated that 978 of the 2,350 people had received flu vaccine.

   (a) Construct a 99 percent confidence interval for the proportion of vaccine-eligible people who had received flu vaccine. Use your confidence interval to comment on the belief that 45 percent of the vaccine-eligible people had received flu vaccine.

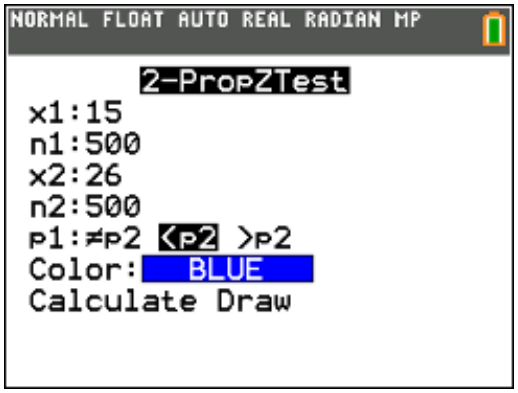


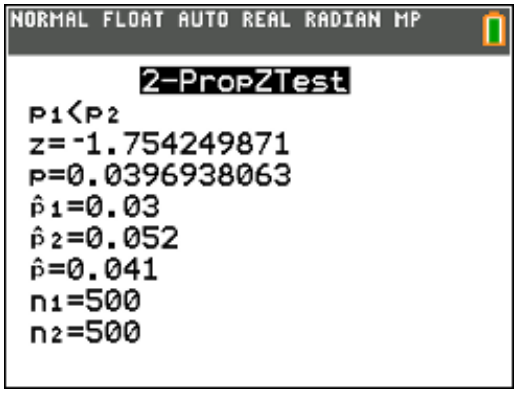


b. 2 Proportion z-test

2015 AP® STATISTICS FREE-RESPONSE QUESTIONS

4. A researcher conducted a medical study to investigate whether taking a low-dose aspirin reduces the chance of developing colon cancer. As part of the study, 1,000 adult volunteers were randomly assigned to one of two groups. Half of the volunteers were assigned to the experimental group that took a low-dose aspirin each day, and the other half were assigned to the control group that took a placebo each day. At the end of six years, 15 of the people who took the low-dose aspirin had developed colon cancer and 26 of the people who took the placebo had developed colon cancer. At the significance level $\alpha = 0.05$, do the data provide convincing statistical evidence that taking a low-dose aspirin each day would reduce the chance of developing colon cancer among all people similar to the volunteers?





c. X^2 test of homogeneity

2016 AP® STATISTICS FREE-RESPONSE QUESTIONS

2. Product advertisers studied the effects of television ads on children's choices for two new snacks. The advertisers used two 30-second television ads in an experiment. One ad was for a new sugary snack called Choco-Zuties, and the other ad was for a new healthy snack called Apple-Zuties.

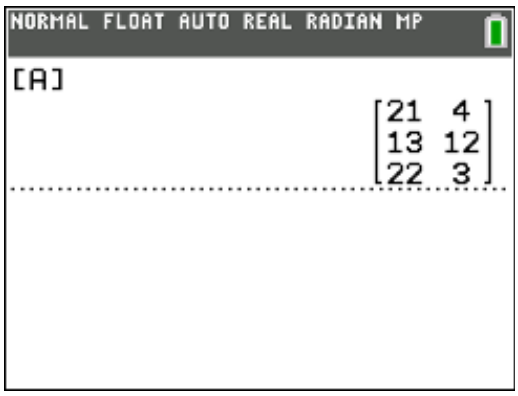
   For the experiment, 75 children were randomly assigned to one of three groups, A, B, or C. Each child individually watched a 30-minute television program that was interrupted for 5 minutes of advertising. The advertising was the same for each group with the following exceptions.

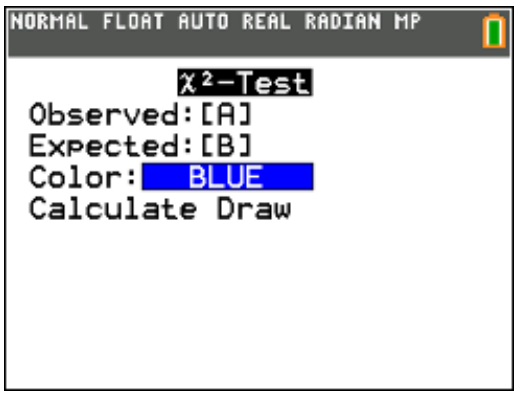
   - The advertising for group A included the Choco-Zuties ad but not the Apple-Zuties ad.
   - The advertising for group B included the Apple-Zuties ad but not the Choco-Zuties ad.
   - The advertising for group C included neither the Choco-Zuties ad nor the Apple-Zuties ad.

   After the program, the children were offered a choice between the two snacks. The table below summarizes their choices.

Group	Type of Ad	Number Who Chose Choco-Zuties	Number Who Chose Apple-Zuties
A	Choco-Zuties only	21	4
B	Apple-Zuties only	13	12
C	Neither	22	3

   (a) Do the data provide convincing statistical evidence that there is an association between type of ad and children's choice of snack among all children similar to those who participated in the experiment?





NOTE: For a Chi-square test, the observed values must be entered in a matrix. To do so, 2nd matrix, EDIT. Choose the dimensions and fill in with the appropriate values.

Run a X^2 Test. Choose the observed matrix (2nd matrix, NAMES), the expected matrix can remain as it is. Calculate. To find the expected matrix, return to 2nd matrix, EDIT for the calculated expected matrix.