

TI-83/84 Contingency Tables

The TI-83/84 calculator can be used to conduct a test for independence in a contingency table (two-way frequency table).

Test for independence of the rows and columns in a contingency table:

Example: The data in the table below looks at the terminal degree type and age of employees at a local manufacturing plant. Use a χ^2 -test and a 1% level of significance to determine if age and terminal degree type are independent.

	High School Diploma	Undergraduate Degree	Graduate Degree
Under 40 years old	42	54	21
40+ years old	68	34	15

Procedure: For this test we will be using a chi-square test for independence. In this case H_0 : The row and column variables are independent and H_a : The row and column variables are dependent. To test:

- Press the **2nd** **χ^{-1}** for the **MATRIX** menu on your calculator (some very old calculators will have a specific key for this or a difference combination of strokes)
- Use the arrow key to move over to the **EDIT** menu
- Highlight **1:[A]** and press **ENTER** :
- Enter the size of the matrix needed, Rows X Columns (it will be the size of the numeric portion of your contingency table, in our case 2×3 without headers)
- Enter the table values into your matrix:
- Press **STAT**
- Use the arrow keys to select the **TESTS** menu
- Select **C: χ^2 -Test** by highlighting it with the arrow keys and pressing **ENTER** or typing C on the calculator:

```

NAMES MATH [00]
1:[A] 2x3
2:[B] 2x3
3:[C]
4:[D]
5:[E]
6:[F]
7↓[G]
    
```

```

MATRIX[A] 2 x3
[ 42   54   21 ]
[ 68   34   15 ]
    
```

```

EDIT CALC [00]
8↑Interval...
9:2-SampZInt...
0:2-SampTInt...
A:1-PropZInt...
B:2-PropZInt...
C:χ²-Test...
D↓χ²GOF-Test...
    
```

- In the menu that comes up enter **[A]** as your Observed matrix and **[B]** as your Expected matrix (the calculator will generate this one for you from matrix A). Use

the **ALPHA** key to enter the letters. A is above the **MATH** key, and B is above the **APPS** key.

- Highlight **Calculate** and press the **ENTER** key:

```

χ²-Test
Observed: [A]
Expected: [B]
Color: BLUE
Calculate Draw

```

You can now complete your hypothesis test by comparing the P-value to the α level given in the problem. In this case, since the P-value is less than the α level given in the problem (.01) we do reject H_0 and can say that at the 1% level of significance there is enough evidence to suggest that the age of the employees and the terminal degree type are dependent on each other.

```

χ²-Test
χ²=11.69090909
P=.0028930194
df=2

```