Here are five ways to create confidence intervals using Excel 2013.

The first two methods can only be used for a single group The last three methodscan be used for multiple groups

UPDATE AUTOMATICALLY

SINGLE GROUP ONLY

| 1A | In the Data Analysis toolkit, use the Descriptive Statistics comand | NO | | | | | | | | | |
|-----------------|---|-----|--|--|--|--|--|--|--|--|--|
| 1B | Use the Average, Stdev, Count and Confidence.T functions | YES | | | | | | | | | |
| | | | | | | | | | | | |
| MULTIPLE GROUPS | | | | | | | | | | | |
| 2A | Use Average, Stdev and Count functions inside a Pivot Table | NO | | | | | | | | | |

| 2B | Use Averagelf and CountIf functions. Use Stdev(IF) in an array | NO* |
|----|--|-----|
| 2C | Use Data functions: Daverage, Dstdev and Dcount | YES |

* The use of an array does not permit any change to the data referenced in that array.

CONCLUSION: What is the best way to create confidence intervals in Excel 2013? For a single group, use the Confidence (or Stdev and Count) and Average functions For multiple groups, use the Data functions: Daverage, Dstdev and Dcount

| Q | 1 Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | 1A | Single sample: Create Ma | rgin of Erro | or using D | escriptive | Statistics | s comman | d | | | | | | |
|--|---|---|---|---|---|--|---|-----|--|--|--|---|--|---|--|---|---|--|--|--|--|
| 0 | 1 | 0 | 0 | 3 | 5 | 67 | 5 | | Step-by-step instructions: | www.Statl | it.org/pdf | f/Excel201 | 3-Create- | -Confiden | ce-Interva | als-Slides.p | df | | | | |
| 0 | 1 | 0 | 1 | 4 | 1 | 62 | 4 | | Formatted data worksheet | t: www.Sta | tLit.org/X | LS/Excel2 | 013-Creat | te-Confide | ence-Inter | vals-Data. | dsx | | | | |
| 0 | 1 | 0 | 1 | 3 | 4 | 60 | 5 | | | | | | | | | | | | | | |
| 0 | 1 | 1 | 0 | 4 | 5 | 60 | 4 | | Step-by-step instructions | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 3 | 1 | 71 | 3 | | 1) From Data menu, select | : "Data Ana | alysis". Se | elect "Des | criptive St | atistics.; F | Press OK. | | | | | | |
| 0 | 0 | 0 | 0 | 5 | 2 | 76 | 6 | | Select input range: A1: | H241. Mal | ke sure to | include ro | ow 1 with | column h | eadings. | | | | | | |
| 0 | 0 | 1 | 0 | 1 | 1 | 63 | 5 | | Check the check box: "L | ck the check box: "Labels in first row" | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 4 | 3 | 65 | 5 | | Under "Output Options | der "Output Options", select radio button for "Output Range". Set range at J19 | | | | | | | | | | | |
| 1 | 0 | 1 | 0 | 3 | 5 | 59 | 7 | | Check boxes for "Summ | eck boxes for "Summary statistics" and "Confidence Level" Press OK. | | | | | | | | | | | |
| 0 | 1 | 1 | 1 | 2 | 1 | 67 | 6 | | | | | | | | | | | | | | |
| 0 | 1 | 0 | 0 | 1 | 5 | 60 | 5 | | 2) Move Question IDs over | r the assoc | iated num | neric resul | ts (one co | l to the rig | ght) | | | | | | |
| 1 | 0 | 1 | 0 | 3 | 2 | 68 | 5 | | Select and delete columns | with repea | ated row o | descriptio | ns: X, V, T | , R, P, N a | nd L. | | | | | | |
| 0 | 1 | 1 | 1 | 1 | 3 | 61 | 3 | | Tighten column width so it | t prints on | single pag | e (landsca | pe). Form | nat as sho | wn. | | | | | | |
| 0 | 0 | 1 | 0 | 4 | 2 | 67 | 6 | | Confidence (bottom line) i | ifidence (bottom line) is margin of error it is not the confidence interval | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 4 | 2 | 70 | 6 | | You could use this data | You could use this data to create the confidence interval (not required for this exercise) | | | | | | | | | | | |
| 1 | 0 | 0 | 1 | 5 | 1 | 54 | 5 | | Confidence interval for (| Q1: From (| 0.46-0.06 | to 0.46+0 | .06. Fron | n 0.40 to (| 0.52. | | | | | | |
| 1 | 0 | 1 | 1 | 3 | 2 | 48 | 6 | Row | J | К | | | | | | | | | | | |
| 1 | 0 | 1 | 1 | 4 | 1 | 64 | 6 | 19 | | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | | | | |
| 0 | 1 | 1 | 1 | 3 | 1 | 72 | Λ | 20 | | | | | | | | | | | | | |
| 1 | ~ | | | | | 15 | 4 | | | | | | | | | | | | | | |
| | 0 | 0 | 0 | 5 | 1 | 66 | 4 7 | 20 | Mean | 0.46 | 0.28 | 0.59 | 0.37 | 3.48 | 2.59 | 65.40 | 5.51 | | | | |
| 0 | 0 | 0 1 | 0 0 | 5 3 | 1 2 | 66 69 | 4 7 5 | 20 | Mean Standard Error | 0.46 0.03 | 0.28 0.03 | 0.59 0.03 | 0.37 0.03 | 3.48 0.08 | 2.59 0.09 | 65.40 0.76 | 5.51 0.08 | | | | |
| 0 0 | 0 | 0 1 1 | 0 0 0 | 5 3 2 | 1 2 3 | 66 69 76 | 4 7 5 4 | 20 | Mean Standard Error Median | 0.46 0.03 0 | 0.28 0.03 0 | 0.59 0.03 1 | 0.37 0.03 0 | 3.48 0.08 4 | 2.59 0.09 2 | 65.40 0.76 65 | 5.51 0.08 6 | | | | |
| 0 0 0 | 0 0 0 0 | 0 1 1 0 | 0 0 0 0 | 5 3 2 4 | 1 2 3 2 | 73 66 69 76 65 | 4 7 5 4 6 | 20 | Mean Standard Error Median Mode | 0.46 0.03 0 0 | 0.28 0.03 0 0 | 0.59 0.03 1 1 | 0.37 0.03 0 0 | 3.48 0.08 4 3 | 2.59 0.09 2 2 | 65.40 0.76 65 76 | 5.51 0.08 6 6 | | | | |
| 0 0 0 0 | 0 0 0 0 | 0 1 1 0 1 | 0 0 0 0 | 5 3 2 4 3 | 1 2 3 2 4 | 73 66 69 76 65 62 | 4 7 5 4 6 4 | 20 | Mean Standard Error Median Mode Standard Deviation | 0.46 0.03 0 0 0.50 | 0.28 0.03 0 0 0.45 | 0.59 0.03 1 1 0.49 | 0.37 0.03 0 0 0.48 | 3.48 0.08 4 3 1.21 | 2.59 0.09 2 2 1.42 | 65.40 0.76 65 76 11.79 | 5.51 0.08 6 6 1.16 | | | | |
| 0 0 0 0 0 | 0 0 0 0 1 | 0 1 1 0 1 1 | 0 0 0 0 0 | 5 3 2 4 3 5 | 1 2 3 2 4 4 | 73 66 69 76 65 62 76 | 4 7 5 4 6 4 6 | 20 | Mean Standard Error Median Mode Standard Deviation Sample Variance | 0.46 0.03 0 0 0.50 0.25 | 0.28 0.03 0 0 0.45 0.20 | 0.59 0.03 1 1 0.49 0.24 | 0.37 0.03 0 0 0.48 0.23 | 3.48 0.08 4 3 1.21 1.46 | 2.59 0.09 2 2 1.42 2.03 | 65.40 0.76 65 76 11.79 139.08 | 5.51 0.08 6 1.16 1.36 | | | | |
| 0 0 0 0 0 | 0 0 0 0 1 0 | 0 1 1 0 1 1 1 | 0 0 0 0 1 0 | 5 3 2 4 3 5 4 | 1 2 3 2 4 4 4 4 | 73 66 69 76 65 62 76 73 | 4 7 5 4 6 4 6 6 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis | 0.46 0.03 0 0.50 0.25 -1.99 | 0.28 0.03 0 0 0.45 0.20 -1.03 | 0.59 0.03 1 1 0.49 0.24 -1.87 | 0.37 0.03 0 0 0.48 0.23 -1.70 | 3.48 0.08 4 3 1.21 1.46 -0.33 | 2.59 0.09 2 2 1.42 2.03 -1.22 | 65.40 0.76 65 76 11.79 139.08 0.39 | 5.51 0.08 6 1.16 1.36 0.21 | | | | |
| 0 0 0 0 0 1 | 0 0 0 1 0 0 | 0 1 0 1 1 1 1 | 0 0 0 0 1 0 | 5 3 2 4 3 5 4 5 | 1 2 3 2 4 4 4 4 1 | 73 66 69 76 65 62 76 73 76 | 4 7 5 4 6 4 6 6 3 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness | 0.46 0.03 0 0.50 0.25 -1.99 0.17 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 | 2.59 0.09 2 1.42 2.03 -1.22 0.43 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 | 5.51 0.08 6 1.16 1.36 0.21 0.15 | | | | |
| 0 0 0 0 0 1 0 | 0 0 0 1 0 0 0 | 0 1 1 0 1 1 1 1 0 | 0 0 0 0 1 0 0 0 | 5 3 4 3 5 4 5 1 | 1 2 3 2 4 4 4 1 4 | 73 66 69 76 65 62 76 73 76 67 | 4 7 5 4 6 4 6 3 6 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness Range | 0.46 0.03 0 0.50 0.25 -1.99 0.17 1 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 1 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 1 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 1 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 4 | 2.59 0.09 2 2 1.42 2.03 -1.22 0.43 4 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 66 | 5.51 0.08 6 1.16 1.36 0.21 0.15 6 | | | | |
| 0 0 0 0 0 1 0 0 | 0 0 0 1 0 0 0 0 0 | 0 1 1 1 1 1 1 0 1 | 0 0 0 1 0 0 0 1 | 5 3 4 3 5 4 5 1 4 | 1 2 3 2 4 4 4 1 4 2 | 73 66 69 76 65 62 76 73 76 67 43 | 4 7 5 4 6 4 6 3 6 5 6 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness Range Minimum | 0.46 0.03 0 0.50 0.25 -1.99 0.17 1 0 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 1 0 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 1 0 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 1 0 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 4 1 | 2.59 0.09 2 1.42 2.03 -1.22 0.43 4 1 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 66 34 | 5.51 0.08 6 1.16 1.36 0.21 0.15 6 3 | | | | |
| 0 0 0 0 1 0 0 1 | 0 0 0 1 0 0 0 0 0 0 | 0 1 1 1 1 1 1 0 1 1 | 0 0 0 1 0 0 0 1 1 | 5 2 4 3 5 4 5 1 4 4 | 1 2 3 2 4 4 4 1 4 2 2 | 73 66 69 76 65 62 76 73 76 67 43 73 | 4 7 5 4 6 4 6 3 6 5 6 6 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness Range Minimum Maximum | 0.46 0.03 0 0.50 0.25 -1.99 0.17 1 0 1 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 1 0 1 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 1 0 1 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 1 0 1 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 4 1 5 | 2.59 0.09 2 2 1.42 2.03 -1.22 0.43 4 1 5 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 66 34 100 | 5.51 0.08 6 1.16 1.36 0.21 0.15 6 3 9 | | | | |
| 0 0 0 0 1 0 1 1 | 0 0 0 1 0 0 0 0 0 0 0 | 0 1 1 1 1 1 1 0 1 1 0 | 0 0 0 1 0 0 1 1 1 | 5 3 4 3 5 4 5 1 4 5 5 | 1 2 3 2 4 4 4 1 4 2 2 4 | 73 66 69 76 65 62 76 73 76 67 43 73 57 | 4 7 5 4 6 4 6 3 6 6 6 6 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness Range Minimum Maximum Sum | 0.46 0.03 0 0.50 0.25 -1.99 0.17 1 0 1 110 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 1 0 1 67 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 1 0 1 142 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 1 0 1 88 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 4 1 5 835 | 2.59 0.09 2 1.42 2.03 -1.22 0.43 4 1 5 622 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 66 34 100 15697 | 5.51 0.08 6 1.16 1.36 0.21 0.15 6 3 9 1323 | | | | |
| 0 0 0 0 0 0 0 0 1 1 1 0 | 0 0 0 1 0 0 0 0 0 0 0 0 0 | 0 1 1 1 1 1 1 0 1 1 0 0 0 | 0 0 0 1 0 0 0 1 1 0 0 | 5 3 4 3 5 4 5 1 4 5 2 | 1 2 3 2 4 4 4 4 1 4 2 2 4 4 4 | 73 66 69 76 65 62 76 73 76 67 43 73 57 66 | 4 7 5 4 6 4 6 3 6 6 6 6 7 | | Mean Standard Error Median Mode Standard Deviation Sample Variance Kurtosis Skewness Range Minimum Maximum Sum Count | 0.46 0.03 0 0.50 0.25 -1.99 0.17 1 0 1 110 240 | 0.28 0.03 0 0.45 0.20 -1.03 0.99 1 0 1 67 240 | 0.59 0.03 1 1 0.49 0.24 -1.87 -0.38 1 0 1 142 240 | 0.37 0.03 0 0.48 0.23 -1.70 0.56 1 0 1 88 240 | 3.48 0.08 4 3 1.21 1.46 -0.33 -0.57 4 1 5 835 240 | 2.59 0.09 2 2 1.42 2.03 -1.22 0.43 4 1 5 622 240 | 65.40 0.76 65 76 11.79 139.08 0.39 0.34 66 34 100 15697 240 | 5.51 0.08 6 1.16 1.36 0.21 0.15 6 3 9 1323 240 | | | | |

| 0 | 1 | 0 | 0 | 3 | 5 | 67 | 5 | | | | | | | - | | | | | | |
|---|---|---|---|---|---|----|---|-----|---|---------|---------|---------|---------|------|------|----------|------|----------------------------------|--|--|
| 0 | 1 | 0 | 1 | 4 | 1 | 62 | 4 | | Step-by-step instr | uctions | 5 | | | | | | | | | |
| 0 | 1 | 0 | 1 | 3 | 4 | 60 | 5 | | 1) R12: Input alpha (0.05): this is the amount of allowable sampling error. | | | | | | | | | | | |
| 0 | 1 | 1 | 0 | 4 | 5 | 60 | 4 | | 2) R13: Enter sample size formula. | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 3 | 1 | 71 | 3 | | 3) R16 and R17: Enter formula; Pull to the left to column K. | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 5 | 2 | 76 | 6 | | 4) R19, R20, and R21: Enter formula; Pull to the left to column K | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 1 | 1 | 63 | 5 | | 5) Format all decimal fractions as numeric with 2 digits after decimal | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 4 | 3 | 65 | 5 | | | | | | | | | | | | | |
| 1 | 0 | 1 | 0 | 3 | 5 | 59 | 7 | | | | | | | | | | | | | |
| 0 | 1 | 1 | 1 | 2 | 1 | 67 | 6 | Row | J | К | L | М | Ν | 0 | Р | Q | R | Formula in col S is for col R | | |
| 0 | 1 | 0 | 0 | 1 | 5 | 60 | 5 | 12 | | | | | | | | Alpha | 0.05 | Manual Entry | | |
| 1 | 0 | 1 | 0 | 3 | 2 | 68 | 5 | 13 | | | | | | | Samp | ole size | 240 | =COUNTA(A2:A241) | | |
| 0 | 1 | 1 | 1 | 1 | 3 | 61 | 3 | 14 | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 4 | 2 | 67 | 6 | 15 | Question | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Question | | |
| 1 | 0 | 0 | 0 | 4 | 2 | 70 | 6 | 16 | Average | 0.46 | 0.28 | 0.59 | 0.37 | 3.48 | 2.59 | 65.4 | 5.51 | =AVERAGE(H2:H241) | | |
| 1 | 0 | 0 | 1 | 5 | 1 | 54 | 5 | 17 | StDev Sample | 0.50 | 0.45 | 0.49 | 0.48 | 1.21 | 1.42 | 11.79 | 1.16 | =STDEV.S(H2:H241) | | |
| 1 | 0 | 1 | 1 | 3 | 2 | 48 | 6 | 18 | Stdev.S and confid | lence. | l is mo | st cons | ervativ | e | | | | Enter dollar signs (\$) as shown | | |
| 1 | 0 | 1 | 1 | 4 | 1 | 64 | 6 | 19 | Margin Error | 0.06 | 0.06 | 0.06 | 0.06 | 0.15 | 0.18 | 1.50 | 0.15 | =CONFIDENCE.T(\$R12,R17,\$R13) | | |
| 0 | 1 | 1 | 1 | 3 | 1 | 73 | 4 | 20 | CnfInt: Up-Right | 0.52 | 0.34 | 0.65 | 0.43 | 3.63 | 2.77 | 66.90 | 5.66 | =R16+R19 | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 66 | 7 | 21 | CnfInt:Low-Left | 0.39 | 0.22 | 0.53 | 0.31 | 3.33 | 2.41 | 63.90 | 5.36 | =R16-R19 | | |
| 0 | 0 | 1 | 0 | 3 | 2 | 69 | 5 | | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 2 | 3 | 76 | 4 | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 4 | 2 | 65 | 6 | | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 3 | 4 | 62 | 4 | | | | | | | | | | | | | |
| 0 | 1 | 1 | 1 | 5 | 4 | 76 | 6 | | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 4 | 4 | 73 | 6 | | | | | | | | | | | | | |
| 1 | 0 | 1 | 0 | 5 | 1 | 76 | 3 | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 1 | 4 | 67 | 6 | | | | | | | | | | | | | |
| 0 | 0 | 1 | 1 | 4 | 2 | 43 | 6 | | | | | | | | | | | | | |
| 1 | 0 | 1 | 1 | 4 | 2 | 73 | 6 | | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 5 | 4 | 57 | 6 | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 2 | 4 | 66 | 7 | | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 52 | 4 | | | | | | | | | | | | | |

| ۷ | 0 | R |
|---|---|---|
|---|---|---|

| Q2 | L Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | 2A | Two | o subgroups: Creat | e Confidence | e Intervals u | sing a Pivot ⁻ | Fable | |
|----|------|----|----|----|----|----|----|-----|------|-----------------------|-----------------|---------------|---------------------------|---------------------|-----------------------------|
| 0 | 1 | 0 | 0 | 3 | 5 | 67 | 5 | • | Can | 't use Confidence f | unction in a | pivot table. | Must use Z, | StDev and Count | |
| 0 | 1 | 0 | 1 | 4 | 1 | 62 | 4 | | Inse | rt Pivot table beha | aves like a co | mmand nc | ot a function! | Data is not auto | matically updated |
| 0 | 1 | 0 | 1 | 3 | 4 | 60 | 5 | | 1 | In cell N29, enter | confidence l | evel: 0.95 | | | |
| 0 | 1 | 1 | 0 | 4 | 5 | 60 | 4 | | 2 | Select data in A1: | B241. Insert | pivot-table. | Output to e | xisting sheet: K29 |). |
| 0 | 0 | 1 | 0 | 3 | 1 | 71 | 3 | | 3 | Use Q2 for colum | in headings. | Use Q1 for c | data values. [| Drag Q1 into value | es three times. |
| 0 | 0 | 0 | 0 | 5 | 2 | 76 | 6 | | 4 | To get multiple d | ata values to | appear in sa | ame columns | (multiple rows), | |
| 0 | 0 | 1 | 0 | 1 | 1 | 63 | 5 | | | drag " Σ Value | es" from Colu | mns area to | Rows area. | | |
| 1 | 0 | 0 | 0 | 4 | 3 | 65 | 5 | | 5 | For data values, o | hange "sumr | marize value | s by" or "Val | ue Field Settings": | : |
| 1 | 0 | 1 | 0 | 3 | 5 | 59 | 7 | | | Change 1st Su | im to Average | e; 2nd Sum t | o Stdev, 3rd | Sum to Count | |
| 0 | 1 | 1 | 1 | 2 | 1 | 67 | 6 | | 6 | Create Margin of | Error (N20), | difference ir | n proportions | s (N22) and confid | ence intervals (N23:N24) |
| 0 | 1 | 0 | 0 | 1 | 5 | 60 | 5 | | | Don't reference | e pivot table | cells by poir | nting. Refere | ence them using co | olumn and row (E.g., N32) |
| 1 | 0 | 1 | 0 | 3 | 2 | 68 | 5 | | | Pull N20 left to | o column L | Pull N23:N2 | 24 left to col | umn L. | |
| 0 | 1 | 1 | 1 | 1 | 3 | 61 | 3 | | 7 | Do confidence in | tervals overla | ap? Compare | e L23:L24 wi | th M23:M24 for o | verlap. |
| 0 | 0 | 1 | 0 | 4 | 2 | 67 | 6 | | | Is difference ir | n proportions | statistically | significant? | If no overlap, say | / "Yes"; otherwise "No". |
| 1 | 0 | 0 | 0 | 4 | 2 | 70 | 6 | Row | J | К | L | М | Ν | Formula for cell t | to the left |
| 1 | 0 | 0 | 1 | 5 | 1 | 54 | 5 | 17 | 1 | Go to Step 2 | Confi | dence Level | 0.95 | Manual entry | |
| 1 | 0 | 1 | 1 | 3 | 2 | 48 | 6 | 18 | ** | ** ** ** ** | ** ** ** | ** ** | ** ** ** | ** ** ** ** | * ** ** |
| 1 | 0 | 1 | 1 | 4 | 1 | 64 | 6 | 19 | | | Q1 if Q2=0 | Q1 if Q2=1 | Q1 | | |
| 0 | 1 | 1 | 1 | 3 | 1 | 73 | 4 | 20 | 6 | Margin of Error | 7% | 12% | 6% | =CONFIDENCE.NO | DRM(1-\$N17,N32,N33) |
| 1 | 0 | 0 | 0 | 5 | 1 | 66 | 7 | 21 | | | Pull N20 lef | t ot L20. | | Type cells (N32) - | - do not point (Won't drag) |
| 0 | 0 | 1 | 0 | 3 | 2 | 69 | 5 | 22 | | Difference in sam | ple proportion | ons. | 3% | =ABS(M31-L31) | |
| 0 | 0 | 1 | 0 | 2 | 3 | 76 | 4 | 23 | | CI-Upper-Right | 53% | 60% | 52% | =N31+N20 | Pull N23 left to L23 |
| 0 | 0 | 0 | 0 | 4 | 2 | 65 | 6 | 24 | | CI-Lower-Left | 38% | 36% | 40% | =N31-N20 | Pull N24 left to L24 |
| 0 | 0 | 1 | 0 | 3 | 4 | 62 | 4 | 25 | | Note: Formulas ir | n columns L a | nd M are de | etermined by | those in column I | N |
| 0 | 1 | 1 | 1 | 5 | 4 | 76 | 6 | 26 | 7 | Confidence I | ntervals over | lap/touch? | YES | Manual entry. | |
| 0 | 0 | 1 | 0 | 4 | 4 | 73 | 6 | 27 | | Is difference | statistically s | significant? | NO | Manual entry. L | Jse overlap test |
| 1 | 0 | 1 | 0 | 5 | 1 | 76 | 3 | 28 | ** | ** ** ** ** | ** ** ** | ** ** | ** ** ** | ** ** ** ** | * ** ** |
| 0 | 0 | 0 | 0 | 1 | 4 | 67 | 6 | 29 | 2 | | Column Lab | els | | | |
| 0 | 0 | 1 | 1 | 4 | 2 | 43 | 6 | 30 | | Values | 0 | 1 | Grand Tota | l | |
| 1 | 0 | 1 | 1 | 4 | 2 | 73 | 6 | 31 | 3 | Average of Q1 | 0.45 | 0.48 | 0.46 | | |
| 1 | 0 | 0 | 0 | 5 | 4 | 57 | 6 | 32 | 4 | StdDev of Q1_2 | 0.50 | 0.50 | 0.50 | | |
| 0 | 0 | 0 | 0 | 2 | 4 | 66 | 7 | 33 | 5 | Count of Q1_3 | 173 | 67 | 240 | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 52 | 4 | 34 | | | | | | | |

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | 2B | Two | sub-groups: Create Co | onfidence Interv | als using arra | ay functions | | | | |
|----|----|----|----|----|----|----|----|-----|------|---|-------------------|------------------|-------------------|-------------------------|--------------|--|--|
| 0 | 1 | 0 | 0 | 3 | 5 | 67 | 5 | | This | approach uses only fu | nctions no cor | mmands. But | one function is | s inside an array. | | | |
| 0 | 1 | 0 | 1 | 4 | 1 | 62 | 4 | | | A function inside an a | rray doe not pe | rmit any chan | ges in the array | y data. | | | |
| 0 | 1 | 0 | 1 | 3 | 4 | 60 | 5 | | Step | o-by-step instructions: | | | | | | | |
| 0 | 1 | 1 | 0 | 4 | 5 | 60 | 4 | | 1 | Enter confidence level in L15. Create Z-cutoff (2 tails) in cell N15. | | | | | | | |
| 0 | 0 | 1 | 0 | 3 | 1 | 71 | 3 | | 2 | M18: Enter AVERAGE | IF function for C | 1 when Q2=1 | L. Drag left to L | 20. Replace =1 wit | h =0. | | |
| 0 | 0 | 0 | 0 | 5 | 2 | 76 | 6 | | 3 | M21: Enter STDEV of | Q1 if Q2=1. Ente | er using CTRL | -SHIFT-ENTER. | Drag left. Change = | =1 to =0. | | |
| 0 | 0 | 1 | 0 | 1 | 1 | 63 | 5 | | 4 | M24: Enter COUNTIF | of Q1 for Q2=1. | Drag left. Re | place =1 with = | :0. | | | |
| 1 | 0 | 0 | 0 | 4 | 3 | 65 | 5 | | 5 | M25: Enter Margin of | f Error for Q1 wh | nen Q2=1. Dr | ag left. | | | | |
| 1 | 0 | 1 | 0 | 3 | 5 | 59 | 7 | | 6 | M27: Enter upper right | ht end of Q1 con | fidence inter | val for Q2=1. | Drag left. | | | |
| 0 | 1 | 1 | 1 | 2 | 1 | 67 | 6 | | | M28: Enter lower-left | t end of Q1 conf | idence interva | al for Q2=1. Dr | ag left. | | | |
| 0 | 1 | 0 | 0 | 1 | 5 | 60 | 5 | | 7 | M29: Do confidence i | ntervals overlap | or touch? (| Compare L27:L3 | 38 with M27:M28. | | | |
| 1 | 0 | 1 | 0 | 3 | 2 | 68 | 5 | Row | | M30: is difference in | proportions stat | istically signif | icant? If M29 = | = No, say "Yes", otł | nerwise "No" | | |
| 0 | 1 | 1 | 1 | 1 | 3 | 61 | 3 | 14 | J | К | L | М | N | Formula for cell t | to the left | | |
| 0 | 0 | 1 | 0 | 4 | 2 | 67 | 6 | 15 | 1 | Confidence Level | 0.95 | Z (2 tail) | 1.960 | =NORM.S.INV(0.5 | 5+L15/2) | | |
| 1 | 0 | 0 | 0 | 4 | 2 | 70 | 6 | 16 | | | | | | _ | | | |
| 1 | 0 | 0 | 1 | 5 | 1 | 54 | 5 | 17 | | L18: Change 1 to 0 | Q2=0 | Q2=1 | Drag M19 to I | V18. Change =1 to | =0 | | |
| 1 | 0 | 1 | 1 | 3 | 2 | 48 | 6 | 18 | 2 | Q1 average | 45% | 48% | =AVERAGEIF(| \$B2:\$B241,"=1",\$A | 2:\$A241) | | |
| 1 | 0 | 1 | 1 | 4 | 1 | 64 | 6 | 19 | | | _ | Pull left | - | | | | |
| 0 | 1 | 1 | 1 | 3 | 1 | 73 | 4 | 20 | | L21: Change 1 to 0 | | | Do not ente | r braces shown be | low! | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 66 | 7 | 21 | 3 | Q1 Stdev | 50% | 50% | {=STDEV(IF(\$E | 32:\$B241=1,\$A2:\$A | 4241))} | | |
| 0 | 0 | 1 | 0 | 3 | 2 | 69 | 5 | 22 | | | _ | Pull left | Use CTRL-SH | HIFT-ENTER to crea | te braces! | | |
| 0 | 0 | 1 | 0 | 2 | 3 | 76 | 4 | 23 | | L24: Change 1 to 0 | | | _ | | | | |
| 0 | 0 | 0 | 0 | 4 | 2 | 65 | 6 | 24 | 4 | Q1 sample size | 173 | 67 | =COUNTIF(\$B | 2:\$B241 <i>,</i> "=1") | Pull left | | |
| 0 | 0 | 1 | 0 | 3 | 4 | 62 | 4 | 25 | 5 | Q1 Margin of Error | 7% | 12% | =\$N15*M21/ | SQRT(M24) | Pull left | | |
| 0 | 1 | 1 | 1 | 5 | 4 | 76 | 6 | 26 | | | | | _ | | | | |
| 0 | 0 | 1 | 0 | 4 | 4 | 73 | 6 | 27 | 6 | Q1 Cnf Int Up-Right | 53% | 60% | =M18+M25 | | Pull left | | |
| 1 | 0 | 1 | 0 | 5 | 1 | 76 | 3 | 28 | | Q1 Cnf Int Low-Left | 38% | 36% | =M18-M25 | | Pull left | | |
| 0 | 0 | 0 | 0 | 1 | 4 | 67 | 6 | 29 | 7 | Ove | erlap or touch? | YES |] | | | | |
| 0 | 0 | 1 | 1 | 4 | 2 | 43 | 6 | 30 | | Is difference st | at. significant? | NO | Use overlap | test | | | |
| 1 | 0 | 1 | 1 | 4 | 2 | 73 | 6 | 31 | | Change =1 to =0 in L1 | 9, L22 and L25. | | - | | | | |
| 1 | 0 | 0 | 0 | 5 | 4 | 57 | 6 | 32 | | | | | | | | | |
| 0 | 0 | 0 | 0 | 2 | 4 | 66 | 7 | 33 | | lf quantitative data, u | ise T in N15. | 1.970 | =T.INV.2T(1-L | 15,COUNTA(A2:A2 | 41)) | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 52 | 4 | | | | | | | | | | |

| Q | 1 Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | 2C | Two sub-groups: Create C | onfidence Interv | vals using Da | ata functions | | | | | |
|---|------|----|----|----|----|----|----|-----|----------------------------|---|-----------------|----------------------------------|------------------|--|--|--|--|
| 0 | 1 | 0 | 0 | 3 | 5 | 67 | 5 | - | This approach uses only fu | nis approach uses only functions no commands. A pivot table behaves like a command. | | | | | | | |
| 0 | 1 | 0 | 1 | 4 | 1 | 62 | 4 | | | | | | | | | | |
| 0 | 1 | 0 | 1 | 3 | 4 | 60 | 5 | | Step-by-step instructions: | | | | | | | | |
| 0 | 1 | 1 | 0 | 4 | 5 | 60 | 4 | | 1 M15: Enter confidence | M15: Enter confidence level. M16: Create Z-cutoff (2 tails). | | | | | | | |
| 0 | 0 | 1 | 0 | 3 | 1 | 71 | 3 | | 2 M21: Enter DAVERAG | EIF function for | Q1 when Q2 | 2=1. Drag left to L21. | | | | | |
| 0 | 0 | 0 | 0 | 5 | 2 | 76 | 6 | | 3 M22: Enter DSTDEV f | unction of Q1 fo | or Q2=1. Drag | g left to L22. | | | | | |
| 0 | 0 | 1 | 0 | 1 | 1 | 63 | 5 | | 4 M23: Enter DCOUNT | of Q1 for Q2=1. | Drag left to | L23. | | | | | |
| 1 | 0 | 0 | 0 | 4 | 3 | 65 | 5 | | 5 M25: Enter Margin of | f Error for Q1 wh | nen Q2=1. D | rag left to L25. | | | | | |
| 1 | 0 | 1 | 0 | 3 | 5 | 59 | 7 | | 6 M27: Enter lower-left | t end of Q1 conf | idence interv | val for Q2=1. Drag left to L27. | | | | | |
| 0 | 1 | 1 | 1 | 2 | 1 | 67 | 6 | | M28: Enter upper rig | ht end of Q1 cor | nfidence inte | rval for Q2=1. Drag left to L28. | | | | | |
| 0 | 1 | 0 | 0 | 1 | 5 | 60 | 5 | | 7 M30: Do confidence i | intervals overlap | or touch? | Compare L27:L28 with M27:M | 28. | | | | |
| 1 | 0 | 1 | 0 | 3 | 2 | 68 | 5 | Row | M31: is difference in | proportions stat | istically signi | ificant? If M30 = No, say "Yes", | otherwise "No" | | | | |
| 0 | 1 | 1 | 1 | 1 | 3 | 61 | 3 | 14 | J K | L | М | N Formula for c | ell to the left | | | | |
| 0 | 0 | 1 | 0 | 4 | 2 | 67 | 6 | 15 | Co | onfidence Level | 0.95 | Manual Entry | | | | | |
| 1 | 0 | 0 | 0 | 4 | 2 | 70 | 6 | 16 | | Z (2 tail) | 1.960 | =NORM.S.INV(0.5+M15/2) | | | | | |
| 1 | 0 | 0 | 1 | 5 | 1 | 54 | 5 | 17 | | _ | | | | | | | |
| 1 | 0 | 1 | 1 | 3 | 2 | 48 | 6 | 18 | Q1 | Q2 | Q2 | subgroups using Q2 data | | | | | |
| 1 | 0 | 1 | 1 | 4 | 1 | 64 | 6 | 19 | Confidence Interval | 0 | 1 | | | | | | |
| 0 | 1 | 1 | 1 | 3 | 1 | 73 | 4 | 20 | | | | Enter formula and then drag | left to column L | | | | |
| 1 | 0 | 0 | 0 | 5 | 1 | 66 | 7 | 21 | Average | 0.45 | 0.48 | =DAVERAGE(\$A\$1:\$H\$241,"(| Q1",M\$18:M\$19) | | | | |
| 0 | 0 | 1 | 0 | 3 | 2 | 69 | 5 | 22 | Std. Deviation | 0.50 | 0.50 | =DSTDEV(\$A\$1:\$H\$241,"Q1" | ,M\$18:M\$19) | | | | |
| 0 | 0 | 1 | 0 | 2 | 3 | 76 | 4 | 23 | Count | 173 | 67 | =DCOUNT(\$A\$1:\$H\$241,"Q1 | ",M\$18:M\$19) | | | | |
| 0 | 0 | 0 | 0 | 4 | 2 | 65 | 6 | 24 | | <u></u> | | _ | | | | | |
| 0 | 0 | 1 | 0 | 3 | 4 | 62 | 4 | 25 | 95% Margin of Error | 0.11 | 0.17 | =\$M16*SQRT(M22/M23) | | | | | |
| 0 | 1 | 1 | 1 | 5 | 4 | 76 | 6 | 26 | Confidence Interval | • | | | | | | | |
| 0 | 0 | 1 | 0 | 4 | 4 | 73 | 6 | 27 | Lower Limit | 0.35 | 0.31 | =M21-M25 | | | | | |
| 1 | 0 | 1 | 0 | 5 | 1 | 76 | 3 | 28 | Upper Limit | 0.56 | 0.65 | =M21+M25 | | | | | |
| 0 | 0 | 0 | 0 | 1 | 4 | 67 | 6 | 29 | | <u> </u> | | | | | | | |
| 0 | 0 | 1 | 1 | 4 | 2 | 43 | 6 | 30 | | Overlap | Yes | Manual entry (Yes or No) | | | | | |
| 1 | 0 | 1 | 1 | 4 | 2 | 73 | 6 | 31 | Statistically-signific | Statistically-significant difference No Manual entry (Yes or No) Use overlap te | | | | | | | |
| 1 | 0 | 0 | 0 | 5 | 4 | 57 | 6 | 32 | , 0 | Ľ | | | | | | | |
| 0 | 0 | 0 | 0 | 2 | 4 | 66 | 7 | 33 | lf quantitative data, ι | ise T in M16. | 1.97 | =T.INV.2T(1-M15,COUNTA(A | 2:A241)) | | | | |