1.2.6

Errors and Debugging

One of the pain points in data analysis is errors. The new column (Average Donation) you created has errors, so let's fix them in order to present a clean analysis to Louise.

When working with data, you're bound to encounter errors. Some errors occur due to a mistake, while others pop up because Excel doesn't recognize a formula's output format, even if it's valid.

Techniques used to fix errors vary. Sometimes errors are obscure and require research, while other errors have simpler fixes, such as correcting a typo. The process of researching an error and incorporating its solution is called **debugging**.

Recall the `#DIV/0!` error we encountered earlier. Why did it occur? Let's investigate.

Kickstarter requires every campaign to have a fundraising goal. However, not every campaign has backers, which means, in some cases, there is no number to divide by in the formula. Our formula, `=ROUND(E2/L2,2)` uses data from the Pledged and Backers columns. Let's look at row 124 and plug in the numbers ourselves. Now, our formula becomes `=ROUND(0/0,2)`. If we were to take out a calculator and try to divide 0 by 0, we'd get an error there, too. No wonder it's not working correctly. The `#DIV/0!` error occurs because numbers are not divisible by zero.

While this error doesn't hinder our research, we can and should clean it up.

Using IFERROR()

To improve the look of our formula output, we'll need to integrate the `=IFERROR(value,value_if_error)` formula. This formula catches errors and replaces them with a user-defined input. In addition, we'll add a bit of a twist by nesting this formula and the ROUND formula.

IMPORTANT

Nesting formulas occurs when one formula is nested, or lies inside, another formula. This is powerful because it allows both formulas to run simultaneously.

The **IFERROR** formula is designed specifically to hold another formula within it, while the ROUND formula is designed only to perform mathematical calculations. If the order was reversed, neither formula would be correct, resulting in additional errors. Therefore, the order of nesting is important.

To address the division error, we'll use this formula:

`=IFERROR(ROUND(E2/L2,2),0)`

Let's break down what's happening here.

- `IFERROR` is now the beginning of the entire formula, so the equals sign is in front of it instead of `ROUND`.
- The value is our intact `ROUND` formula; nothing has been changed.
- `,0)` tells Excel that we want a zero-value input when the formula attempts to divide by 0. The formula is completed by closing the parenthesis.

We specify a zero-value input instead of text (such as "no backers") because we want a numerical data type throughout the column. This way, if we perform analysis on that column's data, we won't encounter additional errors.

Let's first edit the existing formula. While the first cell is selected, the dedicated formula bar (visible just above the active sheet) displays the current formula. Click inside this bar to edit the formula to use the `IFERROR` formula described earlier. Then, apply the updated formula to the entire column (do this by selecting the top cell and hovering over the bottom right corner and double clicking the black + when it appears). Next, scroll down to row 124. You should see that the error has been replaced by a zero.

Because Louise is interested in starting a campaign for theater, let's filter the worksheet to show only theater campaigns in the Category/Subcategory column. Take some time to familiarize yourself with this smaller dataset, also known as a subset of the data. Notice any differences? Similarities? This will allow a more focused view of our category of choice by trimming down the data and eliminating what we don't need.

SKILL DRILL

Scroll to find the first cell of the Average Donation column with a 0 in it and replace the 0 with text, such as "no backers." Then, apply the updated formula to the entire column and view the result.

Repeat these steps, but this time, update the string to "N/A."

Are there any other columns you would apply the `IFERROR` formula to?

There are many different ways to address errors with the IFERROR formula. Because the column we're working with is a numerical data type, change the formula back to `=IFERROR(ROUND(E2/L2,2),0)`.