

Learning to Calculate Percentage Change Between Two Numbers in Excel

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Understanding Percentage Change: A Core Concept

Calculating the [percentage change](#) between two numbers is a fundamental skill across various professional disciplines, from financial modeling and business analytics to simple personal budgeting. This essential calculation provides crucial context by allowing us to determine the relative increase or decrease of a value over a specific period or between distinct categories. Rather than relying solely on the absolute difference, the [percentage change](#) offers a standardized, scale-independent metric, making comparisons significantly more meaningful, especially when dealing with numerical values of vastly different magnitudes. It effectively quantifies how much a quantity shifts relative to its original starting point, providing a clearer indication of true growth or decline.

Whether your task involves tracking quarterly sales performance, analyzing volatility in stock market fluctuations, or diligently monitoring personal operating expenses, mastering the computation of [percentage change](#) is invaluable for informed decision-making. This metric is key to identifying long-term trends and accurately evaluating performance against a benchmark. For example, a modest absolute increase in a very large dataset might translate into a negligible percentage change, whereas the identical absolute increase applied to a small base number could signify a substantial relative percentage increase. Understanding this distinction is paramount for accurate interpretation.

This comprehensive guide is designed to systematically walk you through the precise process of calculating [percentage change](#) utilizing [Microsoft Excel](#), which remains the industry-standard powerful tool for data analysis and manipulation. We will meticulously cover the underlying mathematical principles, demonstrate the practical implementation of the required [formula](#) within Excel's interface, and provide clear guidance on how to interpret and present the resulting data effectively.

Deriving the Fundamental Percentage Change Formula

The core mathematical [formula](#) used to determine [percentage change](#) is elegantly simple and universally applicable across all data environments. The calculation hinges on a direct comparison between a recent, or **New Value**, against an initial, or **Old Value**, baseline value. The resulting difference between these two data points is then expressed as a proportion relative to the original value, which is subsequently multiplied by 100 to convert the ratio into a percentage. This essential methodology ensures that the measured change is always accurately anchored relative to the starting point of the measurement.

The general structure of the mathematical [formula](#) is defined as follows:

$$\text{Percentage Change} = ((\text{New Value} - \text{Old Value}) / \text{Old Value}) * 100\%$$

In practical application, the **New Value** always represents the current, subsequent, or comparison data point, while the **Old Value** (or original value) serves as the definitive baseline from which all change is measured. It is critically important for users to correctly identify and assign which number corresponds to the "new" value and which is the "old" value to maintain the accuracy and integrity of the resulting calculation. A simple error in mislabeling these variables will inevitably lead to incorrect results, particularly affecting the sign (positive or negative) which indicates the direction of the percentage change.

Once the difference (New Value minus Old Value) is calculated and then divided by the Old Value, the intermediate result will be a [decimal](#) ratio. Multiplying this [decimal](#) by 100 effectively converts it into the final percentage value. A resulting positive number explicitly signals an overall increase, whereas a negative number signifies a decline or decrease. If the calculation yields a value of zero, it signifies perfect stability, meaning there has been absolutely no change between the two measured numbers.

Translating the Formula for Microsoft Excel Implementation

Converting the standard mathematical [formula](#) into functional [Excel](#) syntax is a straightforward process facilitated by Excel's use of [cell references](#). This powerful feature allows users to apply a single calculation logic across vast columns or rows of data efficiently, promoting scalability and automation. The utilization of dynamic [cell references](#) is arguably one of [Excel's](#) most significant capabilities, ensuring that all subsequent calculations are automatically and instantly updated whenever the underlying source data is modified.

To initiate the calculation of percentage change within an [Excel](#) spreadsheet, you must input the required [formula](#) directly into a target [cell](#), always commencing the input with an equals sign (=). This prefix instructs Excel that the input is a calculation command rather than static text. The resulting structure of the formula inside the spreadsheet will precisely mirror the mathematical structure, replacing the descriptive terms "New Value" and "Old Value" with their corresponding [cell references](#) (e.g., B2, C2).

For example, if we designate the **Old Value** (or baseline) to be located in [cell B2](#) and the **New Value** (or comparison point) to be in [cell C2](#), the correct [Excel](#) formula required for calculating the ratio change would be entered as follows:

`=(C2-B2)/B2`

This specific syntax accurately calculates the percentage change using the value found in cell **C2** (the new value) relative to the value in cell **B2** (the old value). It is absolutely essential to utilize parentheses around the subtraction operation, **(C2-B2)**, to enforce the standard order of

operations. Failure to include these parentheses would cause Excel to perform the division of B2 by B2 first, yielding an erroneous result for the final percentage change.

Step-by-Step Practical Example: Player Performance Analysis

To provide a clear demonstration of this formula's practical application, let us analyze a common real-world scenario. Consider a sports analyst who possesses a [dataset](#) detailing the total points scored by a team of basketball players across two consecutive years. This structure of data is perfectly suited for performing a year-over-year performance change analysis, revealing player improvement or decline over time.

The following illustration represents a typical [dataset](#) layout: Column A lists the athlete names, Column B records their points scored in Year 1 (the baseline), and Column C displays their points scored in Year 2 (the comparison). Our primary objective is to calculate the relative percentage change in scoring for every player from Year 1 to Year 2, providing a clear metric of their growth trajectory.

	A	B	C	D	E	F
1	Player	Year 1 Points	Year 2 Points			
2	Andy	12	15			
3	Bernard	14	15			
4	Chad	19	22			
5	Derrick	7	16			
6	Eric	12	10			
7	Frank	10	10			
8	George	22	15			
9	Harry	26	25			
10	Isaiah	24	30			
11	John	15	25			
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The core goal is to precisely quantify the degree to which each player's statistical score has

increased or decreased relative to the previous year. This highly valuable insight is crucial for team coaches, performance analysts, and even the athletes themselves to accurately gauge improvement, identify performance plateaus, or pinpoint specific areas that require immediate attention. To begin this analysis, we must first introduce a new column into the spreadsheet, typically designated as "% Change" or "YOY Growth," which will house the results of our calculations.

To calculate the percentage change specifically for the first player listed, Andy, we will input our formula directly into cell **D2**. In the context of this data structure, the points recorded in Year 1 (found in cell **B2**) will function as the **Old Value**, and the points recorded in Year 2 (found in cell **C2**) will represent the **New Value**. Enter the following precise formula into cell **D2**:

`=(C2-B2)/B2`

Interpreting Initial Decimal Results and Verification

Once you have accurately entered the formula into cell **D2** and executed it by pressing the **Enter** key, Excel will instantly display the calculated percentage change for the first player. It is important to note that, initially, this result will be presented as a raw [decimal](#) value, not yet formatted with the standard percentage symbol (%).

	A	B	C	D	E
1	Player	Year 1 Points	Year 2 Points	% Change	
2	Andy	12	15	0.25	
3	Bernard	14	15		
4	Chad	19	22		
5	Derrick	7	16		
6	Eric	12	10		
7	Frank	10	10		
8	George	22	15		
9	Harry	26	25		
10	Isaiah	24	30		
11	John	15	25		
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In this specific example, the output result calculated for Andy is **0.25**. This positive [decimal](#) value clearly indicates that Andy's scoring performance increased by **25%** between Year 1 and Year 2. To intuitively grasp this magnitude, conceptualize **0.25** as being twenty-five hundredths (25/100), which directly translates to 25 percent. The positive sign unambiguously signifies an improvement or upward movement in performance metrics.

To solidify your understanding and confirm the computational accuracy of the Excel formula, we can manually verify this calculation using Andy's raw numerical data points:

Start with the General Formula: Percentage Change = (New Value - Old Value) / Old Value

Substitute Specific Values: Andy's Old Value (Year 1) = 12, New Value (Year 2) = 15. Thus, Percentage Change = (15 - 12) / 12

Perform Subtraction: (15 - 12) = 3. The working formula becomes: Percentage Change = 3 / 12

Perform Division: 3 / 12 = 0.25

This structured manual verification confirms that the formula implemented in Excel correctly produced the ratio **0.25**. After this initial verification, you can efficiently propagate the calculation

logic to the remaining data points by using the fill handle--the small square located at the bottom-right corner of cell **D2**. Dragging this handle downwards to cell **D11** applies the formula across all other players in your [dataset](#), rapidly populating the entire "% Change" column with raw decimal results.

	A	B	C	D	E	F
1	Player	Year 1 Points	Year 2 Points	% Change		
2	Andy	12	15	0.25		
3	Bernard	14	15	0.071429		
4	Chad	19	22	0.157895		
5	Derrick	7	16	1.285714		
6	Eric	12	10	-0.16667		
7	Frank	10	10	0		
8	George	22	15	-0.31818		
9	Harry	26	25	-0.03846		
10	Isaiah	24	30	0.25		
11	John	15	25	0.666667		
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Analyzing Results: Understanding Direction and Magnitude

Once the formula has been successfully applied to your entire dataset, the "% Change" column will present a mixed array of positive, negative, and potentially zero [decimal](#) values. Each of these numerical outcomes carries a specific and crucial meaning regarding the directional movement and magnitude of the data points between the two measurement periods.

A **positive value** in the "% Change" column serves as an unambiguous indicator of an **increase** in the measured value between the initial and subsequent years. This outcome mathematically confirms that the New Value was definitively greater than the Old Value. For instance, if a player's score escalated from 12 to 15, the resulting percentage change will be positive, accurately reflecting growth or improvement in performance. Furthermore, the higher the positive decimal value calculated, the greater the percentage increase experienced.

Conversely, a **negative value** explicitly signifies a **decrease** in the points value over the equivalent period. This calculation occurs when the New Value is numerically smaller than the Old Value. If a player's score dropped from 20 points to 18 points, the resulting percentage change would be negative, signaling a decline or regression in performance. Understanding the precise magnitude of this negative change is essential for a thorough performance evaluation.

Analysts may also occasionally encounter a **zero value** within the "% Change" column. A zero result indicates complete stability, meaning there was absolutely no measurable change between the Old Value and the New Value. In the context of our basketball analysis, this signifies that a player scored the exact same number of points in both Year 1 and Year 2. While less frequent, this interpretation is vital, as it represents stability rather than growth or decline.

Formatting Percentage Values for Enhanced Clarity

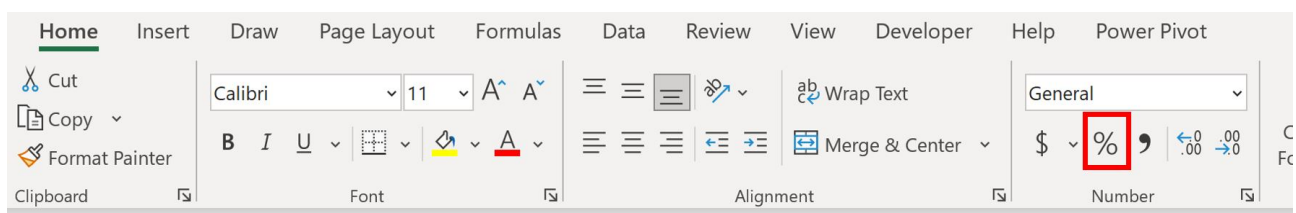
While Excel accurately performs the calculation and yields the percentage change as a raw decimal, presenting these results in the standard percentage [formatting](#) (e.g., 25% instead of 0.25) dramatically improves readability and interpretability for colleagues, stakeholders, and general audiences. This specialized [formatting](#) step is critical for ensuring your data communication is both clear and professional.

To properly format your calculated percentage change values from decimals into actual percentages, follow these straightforward procedural steps:

Select the Target Range: Begin by highlighting the entire range of cells that contains your decimal percentage change results. In the running example, this specific range is cells **D2:D11**.

Navigate to the Home Tab: With the cells actively selected, locate and click the **Home** tab situated on the Excel ribbon at the top of the application window.

Apply Percentage Style: Within the "Number" group on the **Home** tab, identify the "%" icon, often labeled as "Percentage Style." Click this icon to instantly apply the percentage [formatting](#) to your entire selection. Additionally, you can fine-tune the precision by adjusting the number of decimal places displayed using the "Increase Decimal" or "Decrease Decimal" buttons located immediately adjacent to the percentage icon.



Upon successful application of this [formatting](#), every decimal value in the column will be

transformed and displayed as a clear, readable percentage. This crucial step makes the resulting data array significantly easier to interpret and analyze at a single glance. For example, the calculated value of **0.25** will now visibly appear as **25%**, and a decline registered as **-0.10** will accurately display as **-10%**.

	A	B	C	D	E	F
1	Player	Year 1 Points	Year 2 Points	% Change		
2	Andy	12	15	25%		
3	Bernard	14	15	7%		
4	Chad	19	22	16%		
5	Derrick	7	16	129%		
6	Eric	12	10	-17%		
7	Frank	10	10	0%		
8	George	22	15	-32%		
9	Harry	26	25	-4%		
10	Isaiah	24	30	25%		
11	John	15	25	67%		
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Conclusion and Next Steps in Data Mastery

Mastering the calculation of percentage change within the environment of Excel is an indispensable analytical skill that profoundly enhances your ability to derive meaningful, actionable insights from raw numerical data. By consistently applying the simple, yet powerful, formula **=(New Value - Old Value) / Old Value**, you gain the means to rapidly and accurately quantify relative increases or decreases, effectively converting static numbers into dynamic performance metrics. The proficiency to correctly interpret positive, negative, and zero results, coupled with the application of proper visual formatting, will dramatically improve the overall clarity and persuasive impact of your data analysis reports.

Whether your responsibilities lie in tracking complex financial performance indicators, analyzing detailed scientific data, or simply maintaining rigorous control over personal budgets, a solid

understanding of percentage change provides an essential analytical framework through which to rigorously view and compare disparate data points. Excel not only streamlines this entire calculation process but also allows you to perform highly complex analyses effortlessly and visualize emerging trends with unparalleled effectiveness. Regular and consistent practice utilizing these core formulas is the most effective way to build and solidify your proficiency and confidence in advanced data manipulation techniques.

To further expand your analytical expertise and confidently tackle other frequently encountered analytical tasks, we highly recommend exploring additional specialized tutorials and official documentation. These supplementary resources can systematically guide you through more advanced Excel features, including complex conditional formatting, array formulas, and sophisticated data visualization techniques, enabling you to evolve into an even more proficient and skilled Excel user.