

Compound Annual Growth Rate - CAGR



The year-over-year growth rate of an investment over a specified period of time.

The compound annual growth rate is calculated by taking the nth root of the total percentage growth rate, where n is the number of years in the period being considered.

This can be written as follows:

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\left(\frac{1}{\# \text{ of years}} \right)} - 1$$



CAGR isn't the actual return in reality. It's an imaginary number that describes the rate at which an investment would have grown if it grew at a steady rate. You can think of CAGR as a way to smooth out the returns.

Don't worry if this concept is still fuzzy to you - CAGR is one of those terms best defined by example. Suppose you invested \$10,000 in a portfolio on Jan 1, 2005. Let's say by Jan 1, 2006, your portfolio had grown to \$13,000, then \$14,000 by 2007, and finally ended up at \$19,500 by 2008.

Your CAGR would be the ratio of your ending value to beginning value (\$19,500 / \$10,000 = 1.95) raised to the power of 1/3 (since 1/# of years = 1/3), then subtracting 1 from the resulting number:

*1.95 raised to 1/3 power = 1.2493. (This could be written as 1.95^{0.3333}).
1.2493 - 1 = 0.2493*

Another way of writing 0.2493 is 24.93%.

Thus, your CAGR for your three-year investment is equal to 24.93%, representing the smoothed annualized gain you earned over your investment time horizon.