The Math Behind Investing Success

Four Math Principles to Help You Meet Your Financial Goals

The markets are driven by human decisions and emotions, like fear and greed.

Yet investment results don't have to be.

There are four math principles investors can take advantage of for successful goals-based investing:

1. **The Power of Compounding**
2. **The Value of Avoiding Large Losses**
3. **Less Volatility Speeds Up Growth**
4. **Reduce Tail Events for Consistent Returns**

Math Principle 1:
The Power of Compound Growth

Compound growth makes your money grow faster.

Compound growth is the growth rate from your original investment and also any interest, dividends, and capital gains that have accumulated over time. The miracle of compound growth is a snowball effect: growth generates growth which generate even more growth and continues to do so. Your money grows faster and faster as time goes on and the more money you have.

The Rule of 72

A related and helpful tool is the well-known "rule of 72." This is a short cut for estimating how long it would take double your money. The formula divides 72 by the compound annual growth rate. For example, with a 10% compounded annual return, your money would double in 7.2 years.

How long it takes for an investment strategy to double your money matters. The shorter the time period, the sooner the power of compounding kicks into high gear.

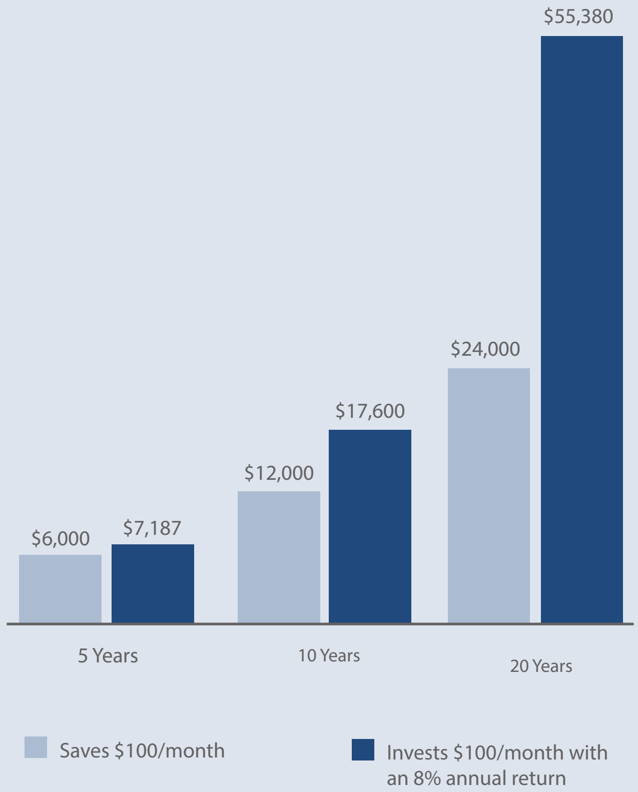
Achilles Heel of Compounding: Losses

The principle of compound growth assumes a consistent rate of return with no losses. The reality is the markets don't move in a straight line and there are periods of losses, especially of longer timeframes. If those losses are significant, they may weaken eventual compound returns, sometimes even setting a reset to a lower level.

This takes us to the next principle: the importance of avoiding large losses.

Compounding is powerful, but it takes time. Mitigating losses during that time can improve the power of compounding.

The Power of Exponential Growth over Time



Math Principle 2: Value of Avoiding Large Losses

A Miracle in Reverse

The miracle of compounding growth depends on a constant rate of growth. Losses, or negative returns, can throw an investment plan off course and severely impact the ending value of the investment. And just like compounding growth impacts wealth in an exponential fashion, so do losses.

Larger Losses Require Greater Gains to Recover

While losses increase in a straight, linear fashion, the gains needed to recover from those losses do not; they grow at an exponential rate. The deeper the hole, the more difficult it is to work your way out of it. The table below shows this principle with an initial $100,000 investment:

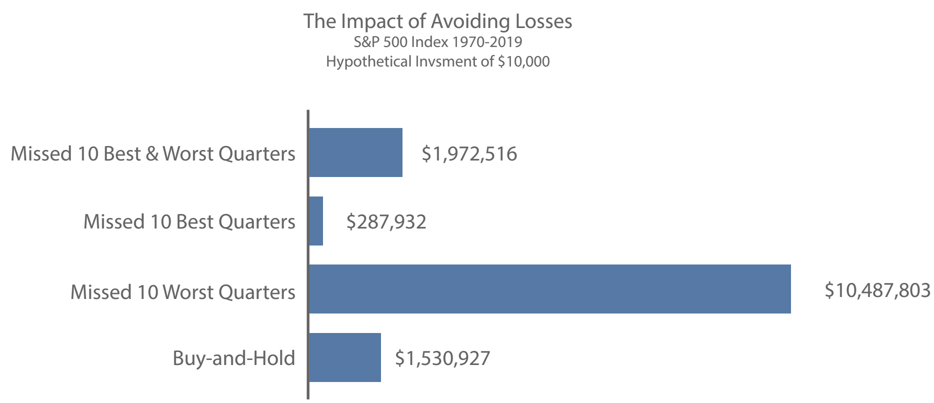
% Loss	$ Loss	% Gain to Break Even	$ Gain to Break Even
10%	-$10,000	11.1%	$11,100
20%	-$20,000	25%	$25,000
50%	-$50,000	100%	$100,000

The bigger the loss, the greater the gains, and the more time, needed to recover those losses.

The Upside to Minimizing Losses

Missing the worst quarters has a more positive impact on your end financial goal than a pure buy-and-hold investing approach. Seeking to avoid big losses performs better than a pure buy-hold strategy. This is the result of the two combined math principles: power of compounding and avoiding large losses.

Large losses can occur much more quickly than large gains (compare the loss of the 2008 bear market to the gains of the 10 year bull market) and can wipe out years of investment growth in just a few months.



Minimizing losses is more important to the ultimate success of an investment plan than maximizing gains or chasing returns.

Math Principle 3: Minimizing Volatility Can Speed Growth

Smoothing the Ride for Better Compound Growth

Lowering volatility is key to achieving better compound growth. Volatility, how much an investment moves up or down in a period of time, slows down the growth rate of your investments and has a negative impact on compound growth.

Volatility Drag

Bear markets, market losses of 20% or more, can be rare, catastrophic floods for a portfolio. Everyday volatility can be seen as water damage that slowly that erodes away the foundations of your house (i.e., investment returns). This is referred to as volatility drag.

Lowering volatility will help mathematically, and it will help you stick to your financial plan so you can take advantage of compound growth.

The Emotional Side of Volatility

High volatility often causes investors to sell investments due to fear and uncertainty. Getting in and out of the market at the wrong time can negatively affect the long-term success of an investment plan.

A smoother, less volatile ride, is better for your portfolio results over time, and easier on your emotions along the way.

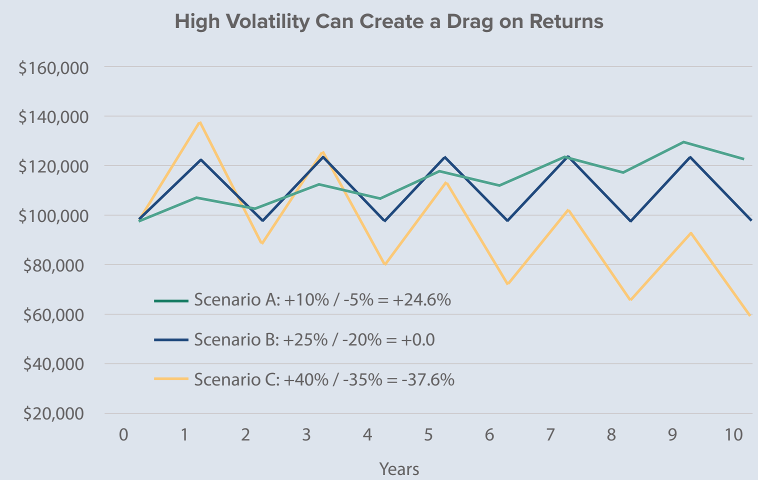
How Volatility Impacts Your End Investment

The higher the level of volatility, the more detrimental the impact of volatility drag. The longer the time period, the bigger the negative impact will be.

Let's take an investment of $100,000 through three different scenarios of volatility and see how it impacts the end result of the investment.

These scenarios detail three possible experiences:

- Up 10% one year, down 5% the next, repeated for ten years
- Up 25% one year, down 20% the next, repeated for ten years
- Up 40% one year, down 35% the next, repeated for ten years



After a decade:

- Scenario A, with most modest gains and losses, performs best and is the only profitable scenario, ending with a 24.6% gain;
- Scenario B breaks even and;
- Scenario C loses money, ending with a -37.6% loss.

Math Principle 4: Reduce Tail Events for Consistent Growth

How Missing Out Benefits Investors

Avoiding large losses and high volatility can lead to better compound growth. But did you know that missing out on extreme bull markets can also help your long-term financial plan?

Many strategies attempt to minimize the left tail risk (investment losses) without impeding the right tail return potential (investment gains). Most investors are happy removing the risk but not the gains.

However, the math behind investment returns shows that strategies that cut both tails, both extreme highs and lows, and focus on achieving consistent, more probable returns in the middle of the bell-shape curve do better off in the long-term.

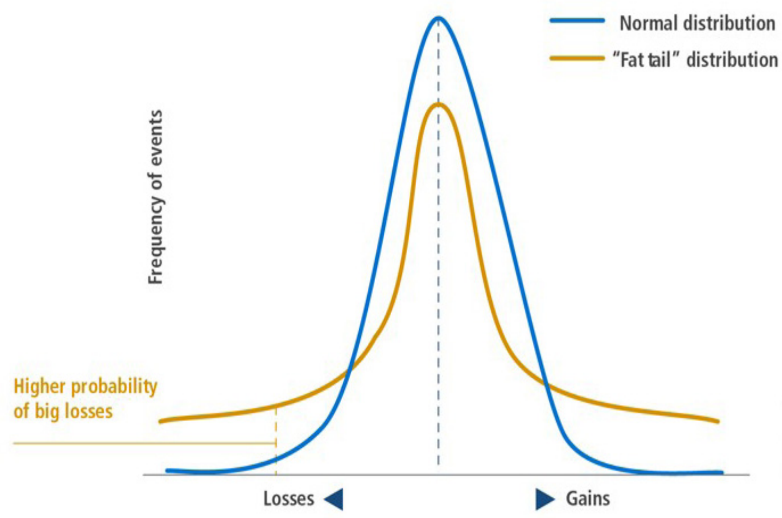
Slow and Steady Wins Your Race

This may seem counterintuitive at first, but chasing gains because you don't want to miss out on substantial gains can be risky and threaten your long-term plans. It's like the story of the Tortoise and the Hare: Chasing gains can get you far quickly, but just one mistake can cause you to fall behind...far behind.

You can be just as successful taking it slow and steady. That's what the math proves anyway.

What Is a Tail Event?

"Tails" refer to the end sections of a distribution curve, demonstrated below. The distribution curve shows all possible market returns, from highest to lowest, and the likelihood of their occurrence. Lower probability occurrences are on the "tails" on the left or right of the bell-shaped curve distribution curve.



Make the Math Work for You

You can unleash the power of compound growth by avoiding large losses, minimizing volatility, and reducing tail events.

But how do you make it happen?

Here are some ideas:

- **Employ investment strategies that seek to reduce large losses and volatility.**
- **Invest passively and avoid market timing.**
- **Reach out to your advisor when your confidence gets shaky to avoid costly emotional decisions.**

The math matters.

Make it *work for you.*

About Swan Global Investments

Formed in 1997, Swan Global Investments is an asset manager that offers proven, goals-based investment solutions seeking to preserve irreplaceable capital and produce consistent returns over full market cycles.

The Defined Risk Strategy is a goals-based approach designed to directly address market risk. It seeks to help investors remain always invested for growth while remaining always hedged to mitigate losses, especially during bear markets.

Important Notes & Disclosures