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Compound Interest Calculator (Report)

Introduction

Compound interest is the interest calculated on the initial principal and also on the accumulated interest of previous periods. It allows investments to grow at a faster rate than simple interest, which only applies to the principal.

General Formula: $A=P\times(1+nr)nt$

Where:

- **A**: Total accumulated amount (initial investment + earned interest)
- **P**: Principal or initial investment
- **r**: Annual interest rate (in decimal form, e.g., 5% = 0.05)
- **n**: Number of times the interest is compounded per year
- **t**: Time in years

Procedure

- JavaScript was used to build a dynamic calculator.
- Inputs: principal (P), rate (r), time (t), and compounding frequency (n).
- Formula applied to compute the final amount.

1. Calculator Results Analysis:

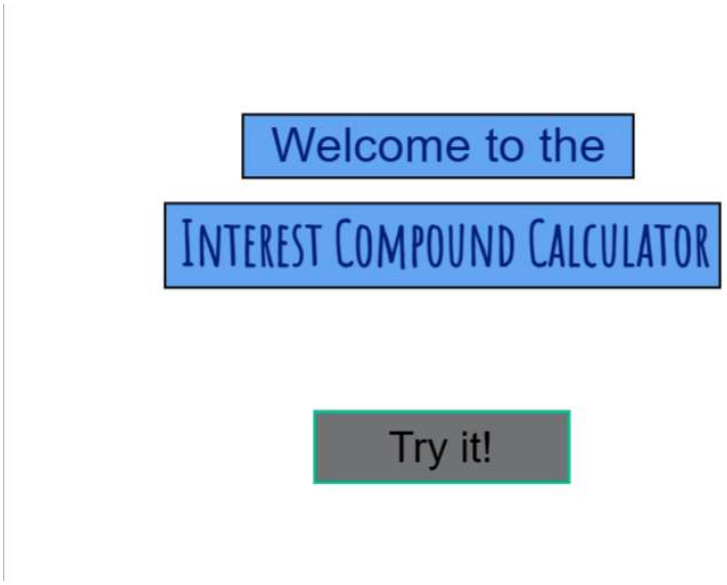
- **When `P` Increases**:
  The **final amount increases proportionally**. A larger initial investment results in more total interest earned.
- **When `r` Increases**:
  The amount grows **exponentially faster**. Even small increases in interest rate can lead to large gains over time.
- **Effect of Time (`t`) on Growth**:
  Time has an **exponential impact**. The longer the investment duration, the greater the compound effect — even if the rate is small.

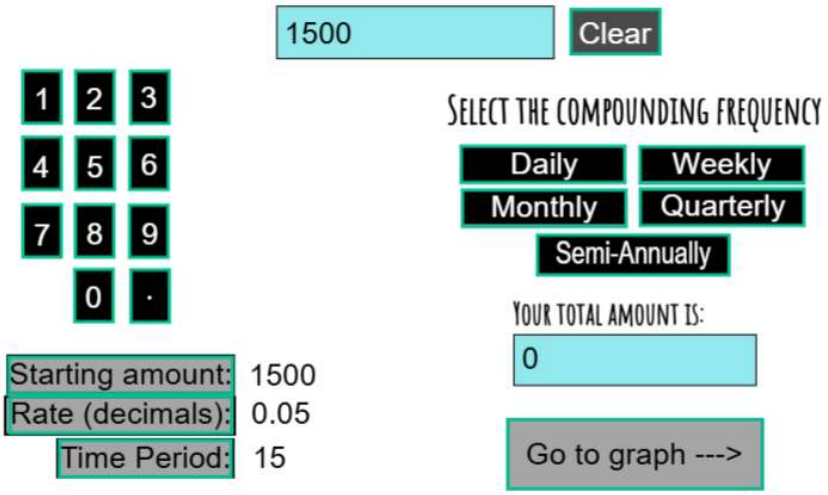
2. Key Questions:

- **Best Strategies for Long-Term Investors**:
  - Start investing early.
  - Choose investments with compounding interest.
  - Reinvest earnings and be consistent.
  - Prefer frequent compounding (daily/monthly).

- **Why Is Compound Interest Powerful?**
  - It allows your money to grow on itself.
  - Over time, interest earns more interest, leading to exponential growth.
  - It's the foundation of wealth accumulation and retirement planning.

Screenshots/Evidence





Conclusion

- The analysis showed that:
- Starting early and being consistent are crucial.
- Even small differences in r or n drastically affect growth over time.
- Compound interest proves to be a reliable and powerful strategy for long-term financial success.