PFL Academy
Chapter 5.2: Compound Interest and the Rule of 72

Student Activity Packet

THE CHALLENGE

Micah is teaching his younger brother about investing. He wants to show him that if he invests his $100 birthday money at 8% annual return, it would eventually grow to $800. His brother is skeptical—how can $100 become $800 without adding more money? Micah needs to explain the "magic" of compound interest.

How does compound interest turn $100 into $800, and how can you calculate how long this transformation takes?

Learning Objectives

- Explain how compound interest grows money exponentially over time.
- Apply the Rule of 72 to estimate how long it takes money to double.
- Calculate the true opportunity cost of spending decisions.

CORE CONCEPTS

Term	Definition
Principal	The initial amount of money deposited or invested.
Simple Interest	Interest earned only on the original principal (Principal × Rate × Time).
Compound Interest	Interest earned on both the principal AND previously earned interest, creating exponential growth.
Rule of 72	A formula to estimate years to double: 72 ÷ Interest Rate = Years to Double.
Opportunity Cost	The future value of money you spend today—what you give up by not investing.

Years to Double = 72 ÷ Annual Interest Rate (%)

Example: At 6% interest, money doubles in 72 ÷ 6 = 12 years

Background: Compound interest is often called the "eighth wonder of the world" because it allows money to grow exponentially. Unlike simple interest (calculated only on the principal), compound interest calculates earnings on your total balance—including previous interest. This creates a snowball effect: the longer your money compounds, the faster it grows. The Rule of 72 is a quick mental math tool to estimate doubling time.

APPLY IT

PART A: RULE OF 72 CALCULATIONS

Complete the table using the Rule of 72 formula: 72 ÷ Interest Rate = Years to Double

Interest Rate	Calculation	Years to Double
2%	72 ÷ 2 =	
4%	72 ÷ 4 =	
6%	72 ÷ 6 =	
8%	72 ÷ 8 =	
12%	72 ÷ 12 =	

1. Using the Rule of 72, how long would it take Micah's brother's $100 to become $200 at 8%?

Years to double: _____

2. How many times must $100 double to reach approximately $800?

Number of doublings: _____ ($100→$200→$400→$800)

3. How many total years would it take for $100 to grow to $800 at 8% interest?

Show your work:

Answer: _____ **years**

> **Hint:** *Multiply the years to double by the number of doublings needed.*

PART B: SIMPLE VS. COMPOUND INTEREST COMPARISON

Compare how $1,000 grows with simple interest vs. compound interest at 5% over 30 years.

Type	Formula	After 30 Years
Simple Interest	$1,000 + ($1,000 × 5% × 30)	
Compound Interest	(Given: $4,322)	$4,322

4. Calculate the simple interest total: $1,000 + ($1,000 × 0.05 × 30) = ?

Simple Interest Total: _____

5. How much MORE money does compound interest earn compared to simple interest over 30 years?

Show your work:

Answer: $_____ more

PART C: OPPORTUNITY COST ANALYSIS

Calculate the true cost of spending decisions by considering future value.

The Daily Coffee Decision

Amanda spends $5 daily on coffee. If she invested that $5 daily ($150/month, $1,800/year) at 7% for 40 years, it would grow to approximately $430,000.

6. What is the opportunity cost of Amanda's coffee habit over 40 years?

Opportunity cost: _____

7. If Amanda cut her coffee spending in half ($2.50/day), approximately how much could she have in 40 years?

Half the investment = _____

CHECK YOUR UNDERSTANDING

1. What makes compound interest more powerful than simple interest?

- [ ] A. It uses a higher interest rate
- [ ] B. You earn interest on your interest, not just the principal
- [ ] C. Banks pay it more frequently
- [ ] D. It requires less initial investment

2. Why is starting to invest early so important, even with small amounts?

_____

_____

3. Calculation: At 9% interest, how long will it take for $5,000 to double? How much will you have after two doublings?

Show your work:

Years to double: _____ Amount after two doublings: $_____

4. Amanda from the scenario wants her laptop fund of $600 to reach $1,200. Her savings account earns 3%. Using the Rule of 72, how long will this take?

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5. Reflection: Think about a regular expense you have. What would be the approximate opportunity cost of that expense over 40 years if invested instead? Is the expense worth that cost to you?
