Compound Interest and Rule of 72 Worksheet

Chapter 5.2: Understanding the Power of Compound Interest and the Rule of 72

This worksheet will help you practice calculating compound interest and applying the Rule of 72 to determine investment doubling times. Use it to analyze different scenarios and understand how variables like interest rate, time, and contribution amounts affect investment growth.

Name: _____ **Date:** _____

Part 1: Understanding Compound Interest

Key Formulas:

Compound Interest Formula:

$$A = P(1 + r)^t$$

Where:
A = Final amount
P = Principal (initial investment)
r = Interest rate (as a decimal)
t = Time period in years

Rule of 72 Formula:

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Years to double = 72 ÷ Annual interest rate (%)
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Example:

If you invest $1,000 at 6% annual compound interest, how much will you have after 12 years?

Using the compound interest formula:

$A = \$1{,}000 \times (1 + 0.06)^{12}$
$A = \$1{,}000 \times (1.06)^{12}$
$A = \$1{,}000 \times 2.012$
$A = \$2{,}012$

Using the Rule of 72 to check our work:

Years to double = 72 ÷ 6 = 12 years

After 12 years, we'd expect our money to double from $1,000 to $2,000, which is very close to our calculated amount!

Part 2: Compound Interest Calculations

Scenario 1: Basic Compound Interest

You invest $2,000 at 8% annual compound interest. Calculate how much you'll have after each time period:

Time Period	Calculation	Final Amount
5 years		
10 years		
20 years		
30 years		

Scenario 2: Comparing Interest Rates

You invest $5,000 for 20 years. Calculate the final amount for each interest rate:

Interest Rate	Calculation	Final Amount
3%		
5%		
7%		
10%		

Analysis Questions:

1. How much more money do you have at 10% compared to 3% after 20 years? What's the percentage difference?

2. What pattern do you notice about how the final amount changes as the interest rate increases?

Part 3: Applying the Rule of 72

Calculate Doubling Time

Use the Rule of 72 to determine how long it would take for your investment to double at each interest rate:

Interest Rate	Calculation	Years to Double
2%		
4%		
6%		
9%		
12%		

Calculate Required Interest Rate

Use the Rule of 72, but in reverse! Determine what interest rate you would need to earn to double your money in the following time periods:

Years to Double	Calculation	Required Interest Rate
36 years		
24 years		
18 years		
12 years		
6 years		

Analysis Questions:

1. How does the doubling time change as the interest rate increases? What pattern do you notice?

2. If you want your money to double in 10 years, what interest rate would you need? What types of investments might offer this return?

Part 4: Real-World Scenarios

Scenario 1: Early Bird vs. Late Starter

Early Bird: Jordan invests $2,000 per year from age 18 to 28 (10 years total), then stops contributing but leaves the money invested until age 65.

Late Starter: Casey waits until age 28 to start investing, then invests $2,000 per year from age 28 to 65 (37 years total).

Both earn 7% annual compound interest. Who will have more money at age 65?

Jordan's Investment:

Casey's Investment:

Who has more at age 65 and by how much?

Scenario 2: Power of Small Increases

You decide to invest $200 per month for retirement. Calculate how much you would accumulate after 40 years at each interest rate:

Interest Rate	Final Amount After 40 Years
5%	
6%	
7%	
8%	

How much extra money would you have at 8% compared to 5%?

Part 5: Personal Application

Your Financial Goal:

Choose a financial goal you have, and use compound interest to determine a savings strategy:

My Goal: _____

Target Amount: $_____

Time Frame: _____ years

Expected Interest Rate: _____%

Calculate how much you would need to:

1. Invest as a lump sum today to reach your goal:

2. Invest monthly to reach your goal:

Reflection:

Based on your calculations in this worksheet, what insights have you gained about compound interest and the Rule of 72? How might this knowledge change your saving and investing habits?