

Review - Compound Investment

Part A — Basics Use: $A = P(1 + r)^t$

1. Identify each variable in the formula.
2. You invest \$1200 at 5% annually for 4 years. Find the final amount.
3. You invest \$2500 at 3.2% annually for 6 years. Find the final amount.
- 4.
5. A GIC earns 4.8% annually. How much will \$1800 grow to in 3 years?
6. You invest \$950 at 6% annually for 5 years. Find the final amount.

Part B — Solve for Principal

7. After 4 years, an investment is worth \$3120 at 5% annually. Find the original investment.
8. A fund grows to \$4850 in 6 years at 4.5% annually. Find the principal.
9. After 3 years, an account has \$2210 at 3.6% annually. Find the principal.

Part C — Solve for Time (logs → years directly)

10. You invest \$2000 at 6% compounded annually. How long until it reaches \$3000?
11. A savings account earns 4% compounded annually. How long will it take \$1500 to double?
12. You invest \$5000 at 5% compounded annually. How long until it grows to \$8000?
13. A student invests \$1200 at 7% compounded annually. How long until it reaches \$2000?

Part D — Doubling Time (extension of logs)

14. You invest \$1500 at 3% annually compounded annually. How long until it doubles?
15. You invest \$2400 at 5% annually compounded annually. How long until it doubles?
16. You invest \$3200 at 6% annually compounded annually. How long until it doubles?
17. You invest \$5000 at 7.2% annually compounded annually. How long until it doubles?
18. You invest \$1800 at 9% compounded annually. How long until it doubles?

Part E — Doubling Patterns and the Rule of 72

19. Use your answers from Part D.
- Pick any two of your doubling times (different rates).
 - Multiply (interest rate) \times (doubling time) for each.
 - What do you notice?
20. Choose a rate from Part D and show algebraically why the starting amount does **not** affect doubling time.

21. The Rule of 72 says:

$$\text{doubling time} \approx \frac{72}{\text{interest rate}}$$

- Use the rule to estimate doubling time at 8%
 - Check using the compound interest formula
 - Compare your answers
22. Estimate (no calculator), Explain how you estimated.
- How long will it take money to double at 8%?
 - How long at 12%?
23. A friend claims: “At 6%, money doubles in about 12 years.”
- Do you agree?
 - Justify using either estimation or calculation.
24. Without solving exactly, decide which doubles faster: Explain your reasoning without calculating both fully.
- 4% or 5%
 - 6% or 9%
25. A bank says: “Invest at 9% and your money will double in 6 years.”
- Does this seem reasonable?
 - Justify using estimation.
26. Use the Rule of 72:
- Estimate the interest rate needed to double money in 10 years
 - Estimate the rate needed to double in 6 years
27. You want your money to double in about 9 years.
- Estimate the required interest rate
 - Would 7% be enough? Explain.