What is Compound Interest?

Worksheet

Compound interest is interest earned on both the principal and previously accumulated interest, calculated as A = P(1 + r/n)^(nt), where the balance grows exponentially over time.

A = P(1 + r)^n

Questions

1. $1,000 at 10% compounded annually for 2 years. What is A?

A) $1,200
B) $1,210
C) $1,100
D) $1,331

2. In A=P(1+r/n)^nt, what does 'n' represent?

A) Number of years
B) Compounding periods per year
C) Principal amount
D) Interest rate

3. Which grows a balance faster at the same annual rate?

A) Simple interest
B) Annual compounding
C) Monthly compounding
D) They're identical

4. What makes compound interest grow exponentially rather than linearly?

A) The rate changes each year
B) Interest is earned on interest already accumulated
C) P increases automatically
D) n is always 1

5. You deposit $2,000 at 4% annual interest, compounded annually (n=1), for 5 years. Find the final amount.

6. $1,000 is invested at 6% annual interest compounded monthly (n=12) for 3 years. Find the final amount.

7. Compare $10,000 at 5% compounded annually (n=1) vs. compounded quarterly (n=4) for 10 years. Which grows more, and what's the difference?

8. Define: What is compound interest?

9. Define: What is the compound interest formula?

10. Define: How does compounding frequency affect growth?

Answer Key

1. B) $1,210 - A=1000(1.10)^2=10001.21=$1,210.

2. B) Compounding periods per year - n is how many times per year interest compounds (e.g. 12 for monthly).

3. C) Monthly compounding - More frequent compounding periods yield slightly higher growth than annual compounding.

4. B) Interest is earned on interest already accumulated - Because each period's interest is added to the base for the next period's calculation, growth compounds/accelerates.

5. A = P(1+r/n)^(nt) A = 2000(1+0.04/1)^(15) A = 2000(1.04)^5 (1.04)^5 1.2167 A $2,433.31

6. A = P(1+r/n)^(nt) A = 1000(1+0.06/12)^(123) A = 1000(1.005)^36 (1.005)^36 1.1967 A $1,196.65

7. Annual: A = 10000(1.05)^10 100001.62889 = $16,288.95 Quarterly: A = 10000(1+0.05/4)^(410) = 10000(1.0125)^40 100001.64362 = $16,436.19 Quarterly compounding grows more by about $147.25

8. Interest calculated on both the principal and previously earned interest, causing exponential growth.

9. A = P(1+r/n)^(nt), where P is principal, r is annual rate, n is compounds per year, and t is time in years.

10. More frequent compounding (e.g. monthly vs annually) produces slightly higher final amounts for the same rate.