

U7D3 Future Value Annuities

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Future Va...

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Annuity (Definition)

An annuity is series of regular payments (or withdrawals) of the same amount each time.

Two basic types of annuity problems:

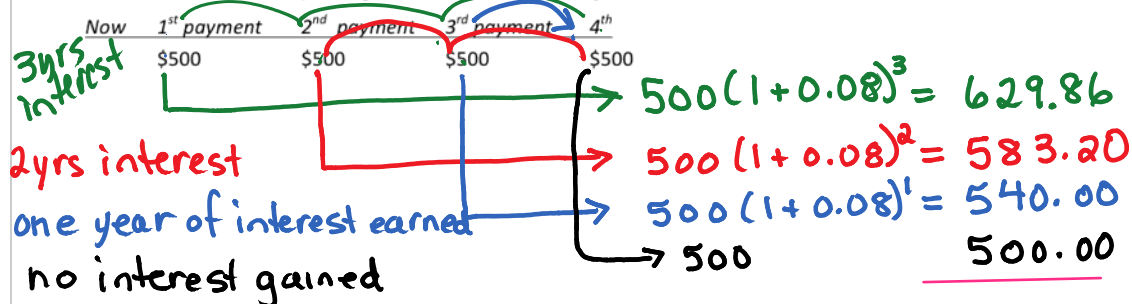
1. Future Value Annuities
2. Present Value Annuities

Method 1 : Using a timeline.

Ex #1 – Find the future value of \$500 deposited at the end of each year for 4 years at an annual interest rate of 8% compounded annually.

Use $A = P(1+i)^n$ for each deposit

$$A = P(1+i)^n$$



Therefore, the annuity will be worth \$ 2 253.06

Method 2 : Using the Annuity Formula.

$$A = \frac{R[(1 + i)^n - 1]}{i}$$

Where A is the accumulated amount of the annuity including interest

R is the “regular” payment or deposit

i is the interest rate per compounding period

n is the number of payments

Ex #1 – Find the future value of \$500 deposited at the end of each year for 4 years at an annual interest rate of 8% compounded annually.

$$R = 500 \quad i = 0.08 \quad n = 4 \quad A = ?$$

$$A = \frac{500[(1.08)^4 - 1]}{0.08}$$

$$A = 2253.06$$

\therefore the investment is worth \$ 2253.06

Method 3: Using technology: Ex #1 – Find the future value of \$500 deposited at the end of each year for 4 years at an annual interest rate of 8% compounded annually.

answer is negative because it is money available to be taken out
The money you put in was +500 per year.

TVM Advanced Calculator

Mode ☒ End ☐ Beginning

Present Value PV

Payment PMT

Future Value FV ← click

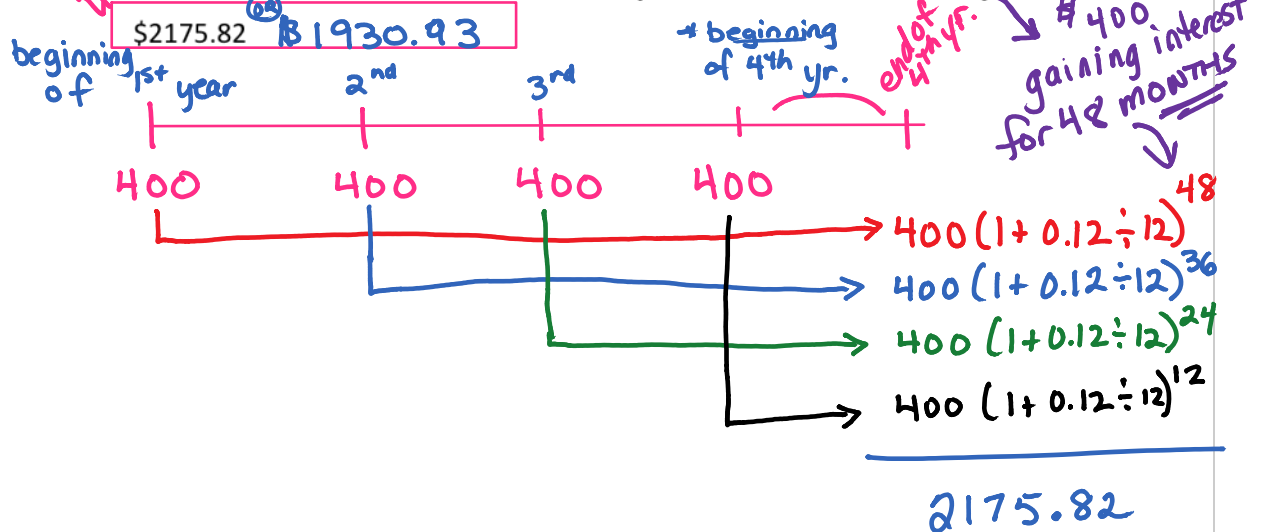
Annual Rate (%) Annually Rate

Periods Monthly Periods

Compounding ☒ Monthly ☐ Annually

Question did not specify if looking for value at beginning or end of 4th year. Solve number 1 with a timeline and the formula ** usually looking for value at end of the last year.* and 2 with the annuity formula.

1. Find the future value of \$400 deposited at the beginning of each year for 4 years at an annual interest rate of 12% compounded monthly. Answer:



∴ Value at end of fourth year would be \$2175.82

2. If your parents deposit \$100 every month into an education fund, for 18 years, how much will be in the account at the time of the last deposit. Interest rate is 3%/a compounded monthly.

Answer: \$28 594.03

$$A = ? \quad P = 100 \quad i = \frac{0.03}{12} \quad n = 18 \times 12 \\ n = 216$$

$$A = \frac{100 [(1 + 0.03 \div 12)^{216} - 1]}{(0.03 \div 12)}$$

$$= \$28\,594.03$$

\therefore you would have \$28594.03