## U7D3 Annuities

Annuity (Definition)
An annuity is series of regular payments (or withdrawals) of the same amount each time.
Two basic types of annuity problems:
1.
2.

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 $A=(1+i)^{n}$ for each deposit
Now $1^{\text {st }}$ payment $2^{\text {nd }}$ payment $3^{\text {rd }}$ payment $4^{\text {th }}$
$\$ 500 \quad \$ 500 \quad \$ 500 \quad \$ 500$

Therefore, the annuity will be worth \$
Method 2 : Using the Annuity Formula. $\quad A=\frac{\mathrm{R}\left[(1+\mathrm{i})^{\mathrm{n}}-1\right]}{\mathrm{i}}$
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.

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.


Solve numbers 1 with a timeline 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 4.3\% compounded annually. Check your answer with the annuity formula. Answer: \$1706.19
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: \$28594.03 Do page 409-410 \#1-7
