METHODS AND MEANINGS

MATH NOTES

Compounding Interest

A bank can pay **simple interest** in which case the amount in the bank grows linearly. For example, 3% simple interest compounded annually on an initial investment of \$2500 would grow in a sequence with a common difference: 0.03(2500) = \$75.The equation and table follow:

$$t(n) = 2500 + 75n$$

Number of Years, n	0	1	2	3	...	10
Amount in Bank, $t(n)$	2500.00	2575.00	2650.00	2725.00		3250.00

If the bank **compounds interest**, the relationship is exponential. For example, 3% annual interest, *compounded annually*, would have a multiplier of 1.03 every year. The equation and table using the example above are:

$$t(n) = 2500 \cdot 1.03^n$$

Number of Years, n	0	1	2	3	...	10
Amount in Bank, $t(n)$	2500	2575.00	2652.25	2731.82		3359.79

If the bank *compounds monthly*, the 3% annual interest becomes $\frac{3\%/\text{year}}{12 \text{ months/year}} = 0.25\%$ per month, and the multiplier becomes 1.0025. The equation and table for the first ten years follows:

$$\text{t}(m) = 2500 \cdot 1.0025^m$$

Number of Months, m	0	12	24	36	...	120
Amount in Bank, $t(m)$	2500	2576.00	2654.39	2735.13		3373.38