**Notes 4-5**

**Sec 1 H** | **Compounded Interest** | **Unit 4**

**For real world situations involving interest use the model:**

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

**Where** $A$ = Final Amount
$P$ = Principle (starting amount)
$r$ = rate % → decimal
$n$ = # of times compounded in one year
$t$ = time (in years) how long in bank

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**Example 1:** You deposit \$4000 in an account that pays 2.92% annual interest. Find the balance after ~~1~~ 20 year if the interest is compounded with the given frequency.

**a.** Annually, $n=1$

$A = 4000\left(1 + \frac{0.0292}{1}\right)^{1t} \rightarrow A = 4000\left(1+0.0292\right)^{t}$

$A = 4000(1.0292)^{t}$

$A = 4000(1.0292)^{20}$

\$7113.04

Growth Equation

**b.** Quarterly, $n=4$

$A = 4000\left(1 + \frac{0.0292}{4}\right)^{4t}$

$A = 4000\left(1 + \frac{0.0292}{4}\right)^{4 \cdot 20}$

\$7157.59

**c.** Monthly, $n=12$

$A = 4000\left(1 + \frac{0.0292}{12}\right)^{12t}$

$A = 4000\left(1 + \frac{.0292}{12}\right)^{12(20)}$

\$7167.70

**d.** Monthly for 3 years & 6 months $t = 3.5$

**Example 2:** Sally invests the same amount of money in three different bank accounts that earns 2.5% interest compounded at different rates. She starts by putting in $2,500. In which bank will Sally have more money after the given amount of time.

**Bank A:** Compounded monthly for 2 years.

$n = 12$

$$A = 2500\left(1 + \frac{0.025}{12}\right)^{12 \cdot 2}$$

$2628.04

**Bank B:** Compounded annually for 4 years.

$$A = 2500\left(1 + \frac{0.025}{1}\right)^{1 \cdot 4}$$

$2759.53

**Bank C:** Compounded quarterly for 3 years.

$$A = 2500\left(1 + \frac{0.025}{4}\right)^{4 \cdot 3}$$

$2694.08