Compound Interest Notes

Name _____ Class Period _____

Consider an initial principal **P** deposited in an account that pays interest at an annual rate **r** (expressed as a decimal), compounded **n** times per year. The amount **A** in the account after **t** years can be modeled by this equation:

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

Rate needs to be a decimal

Compounded:

- Yearly: n = 1
- Monthly: n = 12
- Annually: n = 1
- Semiannually: n = 2
- Quarterly: n = 4
- Daily: n = 365
- Weekly: n = 52

Examples:

1. You deposit $1000 in an account that pays 4% annual interest. Find the balance after 3 years if the interest is compounded quarterly.

P R: .04 t

n = 4

$$A = 1000\left(1 + \frac{.04}{4}\right)^{4(3)}$$ [12]

$1126.83

2. You deposit $2500 in an account that pays 3.5% annual interest. Find the balance after 6 years if the interest is compounded monthly.

$$A = 2500\left(1 + \frac{.035}{12}\right)^{12(6)}$$ [72]

$3083.25

3. You deposit $500 in an account that pays 8.5% annual interest. Find the balance after 10 years if the interest is compounded semiannually.

$$A = 500\left(1 + \frac{.085}{2}\right)^{2(10)}$$ [20]

$1149.45

4. If an investment company pays 7% compounded monthly, how much should you deposit now to have $9,000 7 years from now?

$$9000 = P\left(1 + \frac{.07}{12}\right)^{12(7)}$$ [84]

$$\frac{9000}{1.63} = \frac{P(1.63)}{1.63}$$

P = $5521.47

5. You deposit $25000 in an investment that pays 15% annual interest. Find the balance after 20 years if the interest is compounded annually.

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