6-4: Compound Interest

I can identify the different parts of the compound interest formula.

I can use the compound interest formula in a contextual problem

Equation for Compound Interest

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

A = final amount

P = principal amount

r = rate as a decimal

t = time

n = compounding amount

Example 1: Identify the principal amount, annual interest rate, and the number of times the interest is compounded each year.

$$A = 2000\left(1+\frac{.032}{12}\right)^{12t}$$

$P = \$2000$

$r = .032 \rightarrow 3.2\%$

$n = 12$

$$A = 1500\left(1+\frac{.001}{6}\right)^{6t}$$

$P = \$1500$

$r = .001 \rightarrow .1\%$

$n = 6$

Compounding:

_____ times per **YEAR**

Annually = 1 times per year Semi- annually = 2 times per year

Monthly = 12 times per year Quarterly = 4 times per year

Weekly = 52 times per year Daily = 365 times per year

Example 1: Maria's parents invested $14,000 at 6% per year compounded monthly. How much money will there be in the account after 10 years?

Principal amount invested = $14,000

how often interest is compounded = 12

interest rate = 6% interest rate as a decimal = .06

$$A = 14000\left(1 + \frac{.06}{12}\right)^{12 \cdot 10}$$

$1 + \frac{.06}{12} = 1.005$

After 10 years:

$$= 14000(1.005)^{12 \cdot 10}$$

$25,471.55

Example 2: Determine the amount of an investment if $300 is invested at an interest rate of 3.5% compounded monthly for 22 years.

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

$$A = 300\left(1 + \frac{.035}{12}\right)^{12 \cdot 22}$$

$$A = \$647.20$$

Example 3: When Jing May was born, her grandparents invested $1000 in a fixed rate savings account at a rate of 7% compounded annually. Jing May will receive the money when she turns 18 to help with her college expenses. What amount of money will Jing May receive from the investment?

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

$$A = 1000\left(1 + \frac{.07}{1}\right)^{1 \cdot 18}$$

$$A = \$3,379.93$$