

# Financial Mathematics

## Compound Interest

MathsResource.com

- ▶ Calculating Interest: Principal, Rate and Time are Known
- ▶ When you know the principal amount, the rate and the time.
- ▶ The amount of interest can be calculated by using the formula:  $I = Prt$
- ▶ For the above calculation, we have \$4500.00 to invest (or to borrow) with a rate of 9.5% for a 6 year period of time.

### Formula:

$$A = P(1 + r)^t$$

**P** is the principal (the initial amount you borrow or deposit)

**r** is the annual rate of interest (percentage)

**t** is the number of years the amount is deposited or borrowed for.

**A** is the amount of money accumulated after  $n$  years, including interest.

However, if you borrow for 5 years the formula will look like:

$$A = P(1 + r)^5$$

This formula applies to both money invested and money borrowed.

### Frequent Compounding of Interest

What if interest is paid more frequently? Here are a few examples of the formula:

- ▶ Annually =  $P(1 + r)^t$  = (annual compounding)
- ▶ Quarterly =  $P(1 + r/4)^{t/4}$  = (quarterly compounding)
- ▶ Monthly =  $P(1 + r/12)^{t/12}$  = (monthly compounding)