

# Lecture 12

Wednesday, September 27, 2023 2:20 AM

\* Prayer

- Simple interest:  $n \times APR \times P$
- Interest compounded annually:  $P(1+APR)^n - P$  ← compound period
- If the interest is compounded monthly then the monthly interest rate is  $\frac{APR}{12}$ . Let  $n$  be the number of months. Then the interest after  $n$

months is 
$$P \left( 1 + \frac{APR}{12} \right)^n - P$$
  
*accumulated balance*

In particular, the interest after 12 months (1 year) is

$$P \left( 1 + \frac{APR}{12} \right)^{12} - P$$

The interest rate after 12 months is

$$\frac{P \left( 1 + \frac{APR}{12} \right)^{12} - P}{P} = \left( 1 + \frac{APR}{12} \right)^{12} - 1 > APR$$

This is called APY

(annual percentage yield)

- If the compounding period is quarter then the interest in  $n$  quarters is

$$P \left( 1 + \frac{APR}{4} \right)^n - P$$

If the interest is compounded every day then the interest in  $n$  days is

$$P \left( 1 + \frac{\text{APR}}{365} \right)^n - P$$

If the interest is compounded continuously then the interest in 1 year is

$$P e^{\text{APR}} - P$$

and the interest in  $n$  years is  $P e^{n \text{APR}} - P$ .