Evaluating an Interest Using the Limit

Recall that the formula for compound interest is:

\[ A = P \left(1 + \frac{r}{k}\right)^k \]

and the annual percentage rate is:

\[ \text{APR} = \left(1 + \frac{r}{k}\right)^k - 1. \]

Here \( P \) is the principal invested, \( r \) is the annual “simple” interest rate, \( A \) is the amount in the account at a given time, and \( k \) determines the frequency with which interest is added to the account.

As \( k \) approaches infinity interest is added more and more often; in the limit we say that the interest is compounded continuously.

1. Use the fact that \( \lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n = e \) to compute the APR of 5% compounded continuously.

2. Compute the APR of 10% compounded continuously.