Savings accounts make money for you by adding interest to the amount in your account periodically. This is called **compound interest**.

To figure compound interest, use:

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

where \( A \) is the account balance after \( t \) years,
\( P \) is the beginning principal,
\( r \) is the annual interest rate and
\( n \) is the number of times per year that the interest is compounded.

However, most banks **compound interest continuously** and use this formula:

\[ A = Pe^{rt} \]

where \( A \) is the account balance after \( t \) years,
\( P \) is the beginning principal,
\( r \) is the annual interest rate and
\( e \) is Euler’s number. Euler’s number is an irrational number represented by the infinite series

\[ e = 1 + \frac{1}{1} + \frac{1}{1 \cdot 2} + \frac{1}{1 \cdot 2 \cdot 3} + \ldots + \frac{1}{1 \cdot 2 \cdot 3 \ldots n} + \ldots \]

Euler’s number is on your calculator and is approximately 2.718.
Example: Joe has a choice on whether to invest $1000 in an account that will pay 8% interest compounded quarterly for five years or to invest in a savings account which will pay 4.5% interest compounded continuously over five years. Which account would earn more?