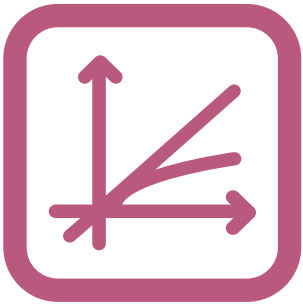

Financial Arithmetic
Course booklet

Basic math skills for business economics students. Contains exponential and logarithmic growth, investment decisions, other applications and more.

SOWISO

ABOUT & PRICING

About SOWISO

SOWISO offers:

- A homework, practice and learning environment;
- Immediate feedback on exercises;
- Different testing and assessment tools;
- Customizable mathematics courses with explanations,
- Examples, and endless randomized practice exercises;
- An authoring tool to create original material;
  - learning analytics giving detailed insight in student performance.
- Integration with your LMS/VLE.

Our learning environment guides students along as they solve problems. When doing exercises, students can enter open answer calculations or mathematical formulas. The environment will analyze their answer and provide targeted feedback and hints helping the student understand the next step in the solving process, or any potential mistakes they made.

SOWISO improves learning experiences and saves time grading!

Pricing

SOWISO partners with higher education institutions on a SAAS licensing basis.

The cost for the platform starts at € 5,50 per student per year, with an additional per student per year fee of € 7,50 per SOWISO course.
A second licensing model is one in which students pay for their own
license in our webshop.

COURSE CONTENT

Chapter 1: Basic Algebra Skills (8 topics)

1. *Linear functions (3 topics)*
    a. Linear equations
    b. General solution of a linear equation
    c. Linear functions and lines

2. *Quadratic functions (3 topics)*
    a. The quadratic formula
    b. Quadratic equations
    c. Quadratic functions and parabolas

3. *Negative exponents (2 topics)*
    a. Negative exponents
    b. Equations with negative exponents

Chapter 2: Exponential and logarithmic growth (10 topics)

4. *Exponential growth (2 topics)*
    a. The notion of exponential function
    b. Exponential growth

5. *Logarithmic growth (3 topics)*
    a. The notion of logarithm
    b. Rules of calculation for logarithms
    c. Equations with logarithms

6. *Future value (5 topics)*
    a. Future value without additional payments
    b. Present value
    c. Calculating interest and duration
    d. Equivalent percentages
    e. Other applications of exp and log

Chapter 3: Sequences and series (13 topics)

7. *The notions of sequence and series (1 topic)*
    a. The notions of sequence and series

8. *Arithmetic series (2 topics)*
    a. Arithmetic sequences
    b. Arithmetic series

9. *Geometric series (2 topics)*
    a. Geometric sequences
    b. Geometric series

10. *Financial applications of sequences and series (8 topics)*
    a. Terminal value of a deposit
    b. Present value of an interest
    c. Pre and postnumerando interests
    d. Varying terms, varying interest percentages
    e. Bullet loan
    f. Linear loan
    g. Annuities
    h. Other applications of sequences and series

Chapter 4: Assessing investments (7 topics)

11. *Introduction to assessing investments (1 topic)*
    a. Assessing investment proposals

12. *Accounting approach (2 topics)*
    a. Payback period
    b. Average rate of return

13. *Economic approach (4 topics)*
    a. The economic approach
    b. Discounted payback period
    c. Net present value
    d. Internal rate of return

Chapter 5: Functions and optimization (6 topics)

14. *Differentiation (2 topic)*
    a. Derivative of a polynomial
    b. Tangent lines

15. *Optimal order quantity (2 topics)*
    a. Local minima and maxima
    b. Analysis of functions

16. *Economical applications (2 topics)*
    a. Economical applications
    b. Expected return and capital structure

Missing something? SOWISO allows teachers to create their own content in our authoring environment.

THEORY & EXERCISE EXAMPLE

Sequences and series: The notions of sequence and series

The notions of sequence and series

In all sort of cases, we encounter number sequences. Suppose € 1000 is deposited into a savings account, and each year 0.2% of interest is added. The amounts $1000, 1002, 1004.004, \ldots$, accrued in the respective years 1, 2, 3, $\ldots$ on the account, are an example of a sequence. Here is a mathematical definition of a sequence.

Sequences

A **sequence** is an ordered list of natural numbers $a_1, a_2, \ldots$ with an **index** (subscript).

The number a_k, in which $k = 1, 2, 3, \ldots$, is also called a **term** or the **k-th term** of the sequence.

In this case the term a_1 is called the **first or initial term**, since it's the term with which the sequence starts.

A sequence is **infinite** if a_k (the index) is defined for each number $k \geq 1$.

A **finite** sequence is often written as $a_1, a_2, \ldots, a_n$, in which n is the length of the sequence.

Example

Theory example

Sequences and series: The notions of sequence and series

The notions of sequence and series

Take a look at the series $b_n = n$ with $b_1 = 1, \quad b_2 = 2, \quad b_3 = 3, \ldots$

The series is derived from the sequence a through $b_n = \sum_{k=1}^{n} a_k$.

What does the sequence a look like?

- $a_1 = 1, a_2 = 1, a_3 = 1, \ldots$
- $a_1 = 1, a_2 = 2, a_3 = 3, \ldots$
- $a_1 = 1, a_2 = 3, a_3 = 6, \ldots$

Check

Theory Solution Hint

Exercise example

THEORY & EXERCISE EXAMPLE

Sequences and series: Arithmetic series

Arithmetic series

The sum of n terms of an arithmetic sequence can be written as:

$$s_n = t_1 + t_2 + t_3 + \cdots + t_{n-1} + t_n = \sum_{k=1}^{n} t_k$$

If we want to calculate the sum for large values of n, it can be a lot of work to calculate each term and adding them. Using the general formula for the sum of the terms instead is way faster.

Sum of an arithmetic sequence

The sum $s_n = \sum_{k=1}^{n} t_k$ of the first n terms of an arithmetic sequence t with initial term t_1 and difference v is equal to

$$s_n = n \cdot t_1 + \frac{(n-1) \cdot n}{2} \cdot v$$

A different expression, using the last term, in stead of the difference, is:

$$s_n = \frac{n}{2} \cdot (t_1 + t_n)$$

Theory example

Sequences and series: Arithmetic series

Arithmetic series

What is the sum of the first 6 terms of the arithmetic sequences with $t_1 = 12$ and $v = 12$?

Hint

The sumformula for an arithmetci sequence is: $\sum_{k=1}^{n} t_k = n \cdot t_1 + \frac{(n-1) \cdot n}{2} \cdot v$.

$\sum_{k=1}^{6} t_k =$ ▮

Check | Theory | Solution | Hint

Exercise example

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