



Basic math skills requirements for Business Economics students

Dear prospective student,

This document will help you understand whether your level of math is sufficient to follow mathematics and statistics courses in the Business Economics programme.

The required basic math skills are listed below per topic, and are illustrated by means of example exercises (▷). You should be able to finish all these exercises without too much trouble and without the use of a calculator.

Arithmetic

- Basic operations with real numbers: addition, subtraction, multiplication, division

▷ Compute

$$2 \cdot (5 + 12 \div 3) \div 3 - 1, \quad 0.5 \cdot 1.2 - 0.1$$

- Powers and roots: basic calculations

▷ Compute

$$\sqrt{10^2}, \quad \sqrt{2500}, \quad 1.2^2, \quad \sqrt{5^2 - 4^2}, \quad \sqrt[3]{-27}, \quad (8.5 - 7.8)^3$$

- Fraction rules: addition, subtraction, multiplication, division, powers and roots

▷ Simplify the following expressions

$$3 + \frac{1}{4 + \frac{1}{5}}, \quad -\frac{2}{3} \div \frac{4}{5} + \frac{3}{7}, \quad \frac{5}{\left(\frac{3}{2}\right)^2}, \quad \sqrt{\frac{30^2}{5}}$$

▷ Convert the following decimals to fractions and simplify when possible

$$0.23, \quad 2.5, \quad 0.02$$

- Absolute value: notation and computation

▷ Compute

$$|-5|, \quad -|-3 + 1|$$

- Percentages: notation and computation
 - ▷ 12% of the 200 students earned a grade of “A” for a given course. How many students earned an “A”?
 - ▷ John is taking his driving exam, which consists of 100 questions. The first time he answers correctly to 50 questions, the second time to 60 questions. How large is the percent increase?

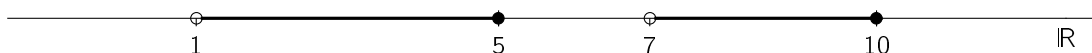
- Factorial: notation and computation

▷ Compute

$$4!, \quad \frac{5!}{3!}$$

- Interval notation

▷ Express the following set in interval notation



▷ Draw the following interval on the real line

$$[-2, 0) \cup (1, 3]$$

Algebra

- Polynomials in one variable: basic operations, special products and factorization

▷ Expand

$$(x - 1)(x + 1)^2, \quad (3x^2 - 5)^2$$

▷ Factorize the following polynomials

$$x^4 - 25x^2, \quad 27x^3 + 1$$

- Equations with real numbers: first and second degree equations

▷ Solve

$$3x + 4 = -x + 8, \quad 20x^2 - x - 1 = 0$$

- Systems of linear equations

▷ Solve

$$\begin{cases} 5x + 6y = 45 \\ 4x + 7y = 47 \end{cases} \quad \begin{cases} 8x - 5y = 0 \\ -3x + 2y = 0 \end{cases}$$

- Inequalities with real numbers

▷ Solve

$$2x - 6 \geq 3 - 2x, \quad 3x - 1 + x > 2x$$

- Summation sign: notation and computation

▷ Compute

$$\sum_{k=1}^5 k, \quad \sum_{k=0}^5 (1 + 2k - k^2)$$

Geometry

- Cartesian plane: axes, coordinates of points
 - ▷ Plot the following points on the Cartesian plane

$$(0, -3), \quad \left(-\frac{1}{2}, 2\right), \quad (\sqrt{9}, 3)$$

- Straight lines: Cartesian equation, slope, intercept
 - ▷ Plot the following lines on the Cartesian plane

$$y = 2x + 3, \quad y = \frac{-x + 3}{2}$$

Trigonometry

- Angles: notation, radians and degrees, unit circle
 - ▷ Convert the following angles in degrees to radians and draw them on the unit circle

$$30^\circ, \quad 45^\circ, \quad -120^\circ$$

- ▷ Convert the following angles in radians to degrees and draw them on the unit circle

$$\frac{2\pi}{3}, \quad 3\pi, \quad -\frac{3\pi}{4}$$

- Trigonometric functions: sin, cos, tan
 - ▷ Compute

$$\sin\left(\frac{\pi}{4}\right), \quad \cos(-60^\circ), \quad \tan\left(\frac{4\pi}{3}\right)$$

Functions

- Graphs of functions: polynomial functions, rational and irrational functions, trigonometric functions, exponential and logarithmic functions
 - ▷ Plot the graph of the following functions

$$x, \quad x^2, \quad x^3, \quad 1/x, \quad \sqrt{x}, \quad |x|$$

- ▷ Plot the graph of the following functions

$$\sin(x), \quad 3\sin(2x), \quad -\cos(x)$$