

# Sarajevo School of Science and Technology

## Entrance Examination SAMPLE

### Mathematics

Duration: 1,5 hours

Use of calculators: Allowed

Department of study: Economics

#### Question 1.

The imaginary number  $i$  is defined such that  $i^2 = -1$ . What does  $i + i^2 + i^3 + \dots + i^{27}$  equal?

- a) -1
- b) 1
- c) 0
- d)  $i$

#### Question 2.

Evaluate the following expression:

$$\frac{14a + 4b}{5(49a^2 - 4b^2)} \cdot \frac{35a - 10b}{4a}$$

**Question 3.**

Number of negative integers which satisfy the inequality  $\frac{2x-4}{x+3} + x - 2 \geq 0$  is?

- a) 0
- b) 1
- c) 2
- d) 3

**Question 4.**

Number of solutions of the equation  $\cos^2 x - 3\sin x - 1 = 0$  in the interval  $[0, \pi]$  is:

- a) 0
- b) 1
- c) 2
- d) 3

**Question 5.**

Evaluate the value of the expression:

$$\frac{3\frac{1}{2} \cdot \left(1\frac{2}{3} - 4.2\right) \cdot 2.25}{\frac{3}{4} \cdot \left(4\frac{1}{2} - 2\frac{3}{4}\right) - \left(5\frac{2}{3} : 3\frac{7}{9}\right)}$$

**Question 6.**

Solve the exponential equation:

$$\frac{3^{x+1} + 3^{x+2} + 3^{x+3}}{39} = 27.$$

**Question 7.**

One class of students was given a math test. 12% of students did not solve the test, 32% of students solved some parts of the test and the rest of 14 students solved the test correctly. What was the number of students in the class?

**Question 8.**

A box contains three black cubes and ten white cubes. One cube is drawn from the box. Its colour is noted and a cube of the other colour is then added to the box. A second cube is then drawn. What is the probability that the second cube selected is black?

**Question 9.**

Suppose we are given a triangle ABC. The length of side AB is equal 3, height CD is equal  $\sqrt{3}$  and it holds:  $AD=BC$ . What is a length of side AC?

**Question 10.**

Suppose that for a quadratic function  $f(x) = ax^2 + bx + c$  it holds:  $f(-2) = 3$ ,  $f(0) = 1$  and  $f(2) = -3$ . Value  $f(1)$  is equal:

a)  $-\frac{1}{4}$

b)  $\frac{1}{4}$

c) 0

d)  $-\frac{3}{4}$