

# Sarajevo School of Science and Technology

## Entrance Examination SAMPLE

### Mathematics

Duration: 1,5 hours

Use of calculators: Allowed

Department of study: **Computer Science**

#### Question 1.

Evaluate the expression:

$$\frac{\sqrt{12} + \sqrt{48} - \sqrt{27}}{\sqrt{75} - 2\sqrt{3}}.$$

#### Question 2.

Simplify the expression:

$$\frac{(x-1)^2 - y^2}{(x+1)^2 - y^2} \cdot \frac{x^2 - x - xy}{x^2 + x - xy}.$$

**Question 3.**

A sum of digits of the unknown number  $xy$  is equal 14. If we change places of digits  $x$  and  $y$ , we get a number which is greater than a number  $xy$  for 18. What is the value of the unknown number  $xy$ ?

**Question 4.**

Solve the equation

$$a^2b - \frac{a+x}{b} = ab^2 - \frac{b+x}{a},$$

where  $a$  and  $b$  are the constants such that it holds:  $ab \neq 0, a \neq b$ .

**Question 5.**

Evaluate the value of the expression:

$$\frac{\left(-16 + 4\frac{3}{4}\right) : 3\frac{4}{5} + 4\frac{1}{4} : (-0,85)}{10 - 4,8 : \frac{6}{25}} : (0,4).$$

**Question 6.**

Solve the exponential equation:

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

**Question 7.**

There are 760 pupils and teachers in total in one school. A number of boys is 8 times bigger than a number of teachers, while number of girls and number of boys have a proportion 5:4. What is the percent of boys, what is the percent of girls and what is the percent of teachers in a school?

**Question 8.**

A box contains three black cubes and seven 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.**

Evaluate a parameter m such that a function :

$$f(x) = 3 - mx + 3m - 2x,$$

is parallel to a function  $f(x) = 7x - 5$ , where m is a real parameter.