**National Research Tomsk State University**

**Admissions Committee**

**Exam Paper (bachelor/specialist) No.5**

**Subject: Mathematics**

Instructions

You have 4 hours to complete the exam. The exam paper consists of 2 parts and contains 10 tasks.

Do not write statements of the tasks in your answer sheet. All tasks must be solved in a draft answer sheet. Tasks, which are not solved in a draft answer sheet, are not accepted. For each task solved in the answer sheet, write the full reasoned solution and the answer. In the answer sheet, answers for Part 1, 2 must be written in the Answer Table shown below.

Answer Table for Part 1, 2

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Task No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total score |
| Answer |  |  |  |  |  |  |  |  |  |  |
| Points |  |  |  |  |  |  |  |  |  |  |  |

**Part 1**

1. The price for the product was raised by 22% and amounted to 2013 dollars. What was the price of the product before the price was raised?

**(6 points)**

1. Find value of the expression .

**(6 points)**

1. Solve the equation .

**(8 points)**

1. Solve the equation .

**(8 points)**

1. Solve the equation  and in the answer sheet write down the sum of the roots of the equation.

**(8 points)**

1. Solve the equation . If the equation has more than one root, please indicate the one that is bigger one.

**(8 points)**

**Part 2**

1. Find the minimum value of function  in the intercept .

**(12 points)**

**8.** The sum of the lengths of the legs of a right-angled triangle is 12, and the hypotenuse is . Find the total area of the triangle.

**(14 points)**

**9.** Solve the equation .

**(14 points)**

**10.** Solve the inequality .

**(16 points)**

**Chairman of the Board on Mathematics: Sokolov B.**

**Approved by:**

**Vice-Rector for Academic Affairs: Dyomin V.**