

Dear participants of HSE GSC-2021!

A competition task in Mathematics contains three parts:

First part (problems 1-6) needs just numerical answers. If an achieved answer is not integer it should be input as a decimal fraction with the decimal point as a delimiter (for example 1.1 for 11/10). The precision of the input should be 2 decimal places after the decimal point. The rest of the fractional part should be cut off if the precise answer has more than two places in its decimal notation (meaning lower (floor) rounding should be used to the closest decimal fraction with two places after the decimal point). For example, a number 0.5 should be input exactly as it is, and a 0.555 should be input as 0.55.

Second part (problems 7-8) needs both answers and explanations (in a form of thesis proof which is a listing of all major stages of the proof and the main calculations). The text of a thesis proof should contain the PRECISE answers (without approximation).

Third part (problems 9-10) needs writing down full solutions (the solution should also contain answers if they are supposed by a problem, but always it should contain the proof).

Here are some constants with a precision 4 places after the decimal point (achieved by rounding “down”):

$$\sqrt{2} = 1.4142 \dots \quad \sqrt{3} = 1.7320 \dots \quad \sqrt{5} = 2.2360 \dots \quad \sqrt{7} = 2.6457 \dots \quad \pi = 3.1415 \dots \quad e = 2.7182 \dots$$

Participants in Mathematics may use *paper sheets for drafts*: up to 3 A4 sheets (recommended number; more if needed), clear on both sides (without any signs or text), prepared in advance. A proctor will ask to show all sheets, both sides before a participant starts the Competition.

Academic committee, Mathematics

HSE GSC-2021