GAUSS ACADEMY of Mathematical Education

MATH UNITES US

# 2021 Gauss Math Tournament

## Division I Target Round

## Instructions

Welcome to the 9th annual Gauss Mathematics Tournament! Please make sure that you are in the correct division. You are about to take the Division III Sprint and Target rounds for students in grades 3-4. If you are not in these grades, please let us know right away and we will help you find your proper division.

You will first take the **Sprint Round**, which will be a 50 minute contest consisting of 40 short-answer problems. The problems are in increasing difficulty order and are worth one point each.

After a short break following the end of the Sprint Round, you will take the **Target Round**, which will consist of 8 problems to be solved in 20 minutes. The problems are in increasing difficulty order and are worth two points each.

The ten highest total scorers on the Sprint and Target rounds will advance to the **Countdown Round**, an exciting head-to-head buzzer contest. More details will be given at the beginning of the Countdown Round.

**You may use a calculator on both the Sprint and Target Rounds.** However, other aids, such as books, notes, other people, magic crystal balls, etc. are prohibited.

**Please read the section below regarding important formatting instructions.** These rules are important to remember while taking the test as you may not receive credit for an improperly formatted answer.

Good luck, and may the odds be ever in your favor!

## Formatting

For both the Sprint and Target Rounds, your answers will be collected on a Google Form. The answer to each question will be a rational number. If your answer is an integer, it should be input as such. For example, if a question asks "What is $1 + 2$?" the correct input is

$$3$$

If your answer is a rational number, you should input it as an **improper fraction in lowest terms**. If you answer as a mixed number or decimal, or is not in lowest terms, your answer will be marked wrong. For example, if a question asks "What is 57 divided by 6 in simplest form?" the **only** acceptable answer is:

$$19/2$$

The following answers will **not** be accepted:

$$57/6 \qquad 9\ 1/2 \qquad 9.5$$

If any answer is negative, simply enter a minus sign (dash) in front of the number, but **do not leave any space between the minus sign and the number**. For example, an answer of $-\frac{3}{4}$ should be input as:

$$-3/4$$

and not as:

$$-\ 3/4$$

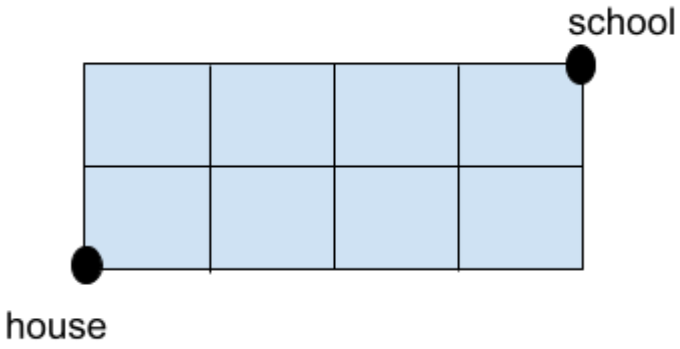
Please keep these rules in mind as you answer the problems!

1) What is the maximum possible product of two integers whose sum is 30?

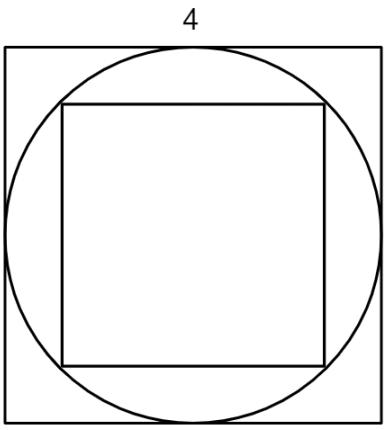
2) The chess club has six members. For the next meet, the coach can take a team with only five members. In how many ways can the coach choose the team for the next meet?

3) If a#b=√(ab)+a+b, what is 8#18?

4) Timmy is trying to get to the school from his house. If his house is in the bottom left and the school is at the top right, and he can only move up or right while following grid lines, how many paths can he take to get to the school?

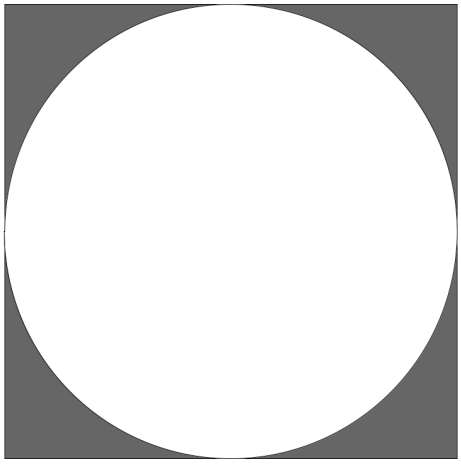


5) A square is inscribed in a circle, which is inscribed in another square, as shown below. If the side length of the larger square is 4, what is the area of the smaller square?




6) Elizabeth is trying to break into a safe, but it needs a numerical passcode in order to unlock, and the numpad only contains the numbers 1-9. Elizabeth knows that the keycode is at most 4 digits long, so she decides to try each possible passcode starting from smallest to largest (1, 2, 3,... 9997, 9998, 9999). If the passcode is 2021, how many numbers will she have inputted by the time the safe opens?

7) A circle is inscribed within a square with side length 8. What is the area of the shaded section?



8) How many different arrangements of the word “GAUSS” can you make? Arrangements are not necessarily real words.