

גס"ד

First Greater Boston Math Olympiad 4th Grade

Your name: _____

Try to solve as many problems as you can, in any order you choose. There are six problems, and a correct solution of each of them wins you the number of points shown in parentheses. Show your work. If your answer is wrong but your method is correct, you will get partial credit. If necessary, use back sides of pages or attach additional sheets, putting your name on them.

Good luck!

*****PLEASE DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO*****

1. (10) Solve:

$$\begin{array}{r} ABC \\ + \\ BCA \\ \hline 719 \end{array}$$

(here ABC and BCA are 3-digit numbers with digits A,B,C, and different letters stand for different digits).

Answer:

A=

B=

C=

You can use the space below for the scratch work.

2. (8) John wrote down 2004 numbers: 1, 2, ..., 2004. How many digits did he write? (**Hint:** you may want to find out how many of these numbers have 1, 2, 3, 4 digits.)

Answer:

Explanation:

3. (8) How many zeros are there at the end of the number $100! = 1 \times 2 \times \dots \times 100$? (**Hint:** find out how many times $100!$ is divisible by 5.)

Answer:

Explanation:

4. (8) Put 5 points on the plane so that each 3 of them are vertices of an isosceles triangle (i.e., a triangle with two equal sides), and no three points lie on the same line.

Answer:

You can use the space below for the scratch work.

5. (10) How many times in a half-day (= 12 hours) the hour and the minute hand of a clock form the right angle with each other?

Answer:

Explanation:

6. Money in Wonderland comes in \$5 and \$7 bills.

(a) (6) What is the smallest amount of money you need to have in order to buy a slice of pizza which costs \$1 and get back your change in full? (The pizza man has plenty of \$5 and \$7 bills.) For example, having \$7 won't do, since the pizza man can only give you \$5 back.

Answer:

Explanation:

(b) (10) Vending machines in Wonderland accept only exact payments (do not give back change). List all positive integer numbers which CANNOT be used as prices in such vending machines. (That is, find the sums of money that cannot be paid by exact change.)

Answer:

Explanation: