

Bergen County Mathematics League

Good Luck To You



Good Luck To All

Contest #2 (Calculators Allowed)

2015-2016

Part I *Time Limit: 12 minutes* Answers must be exact or have 4 (or more) significant digits, correctly rounded.

2-1. If $n!$ is the product of the first n positive integers, which is greater, $2015!$ or 1008^{2015} ?

2-2. Two different circles can have n common tangents. What are all possible values of n ?

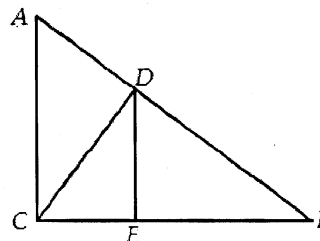
Part II *Time Limit: 12 minutes*

2-3. If $x^2 + 6x = 45$, what is the value of $x^4 + 12x^3 + 36x^2 - 10$?

2-4. In a 10000-meter race between the hare and the tortoise, the hare's speed was 5 times that of the tortoise. They started at the same place and at the same time and ran at constant speeds. The hare ran for a while, then went to sleep. The tortoise ran all the time. When the hare awakened, he tried to catch the tortoise but was 100 meters behind when the tortoise crossed the finish line. How far, in meters, did the tortoise run while the hare was sleeping?

Part III *Time Limit: 12 minutes*

2-5. In right $\triangle ABC$, as shown, $m\angle C = 90$, $AC = 3$, $BC = 4$, $\overline{CD} \perp \overline{AB}$, and $\overline{DE} \perp \overline{BC}$. How long is \overline{DE} ?



2-6. In a takeout restaurant, there are 10 different food choices. A guest is given 4 boxes to take out the food he/she likes. Each box can only contain one type of food. The types of food in the boxes that the guest take out are not necessarily different. How many ways are there to put the food into 4 boxes?

Answers

2-1. 1008^{2015}

2-2. 0, 1, 2, 3, 4

2-3. 2015

2-4. 8020

2-5. $48/25$

2-6. 715