Bergen County Mathematics League

Good Luck To You — Good Luck To All

Contest #2 (Calculators Allowed) — **2007-2008**

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

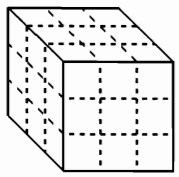
2-1. A closed curve is drawn in a plane so that each point on the curve is 1 unit outside a 3×4 rectangle. What is the area of the region in the plane that's enclosed by this curve?

2-2. Of the first 1200 positive integers, how many are divisible by neither 3 nor 4?

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

2-3. How many teams are in a competition in which each match pits 2 teams against each other if it takes 105 matches for every team to play against every other team exactly once?

2-4. A cubical solid is cut into 27 smaller cubical solids, as shown at the right. This can be done in as few as 6 slices by cutting through more than one piece at a time. For safety, pieces may be moved before or after (but not *during*) each slice. What is the least number of slices that are needed to cut a cubical solid into 64 smaller cubical solids?



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

2-5. In an equilateral triangle with both an inscribed and a circumscribed circle, if the area of the larger of these two circles is 60, what is the area of the smaller?

2-6. My truck's tires have a diameter of 2.5 feet. What is my truck's speed, in miles per hour, when its wheels turn 600 times per minute?

***Notice*: A question next meet will repeat the theme of question 2-3.**

Answers

2-1. $26+\pi \approx 29.14159265359\ldots$

2-2. 600

2-3. 15

2-4. 6

2-5. 15

2-6. $375\pi/22 \approx 53.549874777\ldots$ or $(375\pi/22)$ mph