Bergen County Mathematics League

Good Luck To You

BCML

Good Luck To All

**Contest #3 (No Calculators)**

2007-2008

Part I *Time Limit: 12 minutes*   On contests #4 and #6, *any S.A.T. calculator will be allowed.*

3-1. I first drove 16 km at 48 km/hr, then I drove 20 km at 40 km/hr, and finally I drove 24 km at 36 km/hr. What was my average speed, in km/hr, for the entire trip?

3-2. How many different triangles have vertices selected from the seven points $(-4,0)$, $(-2,0)$, $(0,0)$, $(2,0)$, $(4,0)$, $(0,2)$, and $(0,4)$?

Part II *Time Limit: 12 minutes*

3-3. Three circular cylinders are strapped together as shown at the right. The cross-section of each cylinder is a circle of radius 1. Presuming that the strap used to bind the cylinders together has no thickness and no extra length, how long is the binding strap?
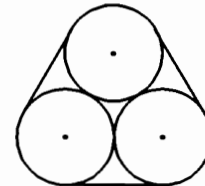
3-4. Express, as a *fraction in lowest terms*, the sum

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \ldots + \frac{1}{(n)(n+1)} + \ldots + \frac{1}{99 \times 100}.$$

Part III *Time Limit: 12 minutes*

3-5. Randomly select one of the 900 three-digit numbers in $\{100, 101, \ldots, 998, 999\}$. What is the probability that the number selected is a perfect square?

3-6. What are the coordinates of the reflection of $(6,0)$ across the graph of $y = 3x$?

Notice: **Questions next meet will repeat the themes of questions 3-3 and 3-5.**

Answers

3-1. 40 or 40 km/hr

3-2. 24

3-3. $6+2\pi$

3-4. 99/100

3-5. 11/450

3-6. $(-4.8, 3.6)$