

Bergen County Mathematics League

Good Luck To You



Good Luck To All

Contest #4 (Calculators Allowed)

2015-2016

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

- 4-1. By how much does the sum of the 63 integers from 64 to 126 exceed the sum of the 63 integers from 1 to 63?
- 4-2. When 70 is decreased by 20%, the result is A . When A is increased by 25%, the result is B . When B is decreased by 60%, the result is C . When C is increased by 150%, the result is D . What is the value of D ?
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Part II *Time Limit: 12 minutes*

- 4-3. In rectangle $ABCD$, $AB = 8$, and $BC = 5$. When $ABCD$ is revolved around \overline{AB} in a 3-dimensional space, the result is right circular cylinder R . What is the volume of R ?
- 4-4. Each student in a certain college dormitory takes at least one of three courses: Art 101, English 101, and Math 101. If 19 students study English, 22 students study math, 22 students study art, 7 students study English and art, 8 students study English and math, and 9 students study art and math, and 3 students study all 3 subjects, then how many students are there in the dormitory?
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Part III *Time Limit: 12 minutes*

- 4-5. For what value of $a > 0$ is an equilateral triangle formed by the x -intercepts and the vertex of the graph of $y = a|x^2 - 4x - 21|$?
- 4-6. Four positive numbers, a , b , c , and d , have the property that $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$ and $a > d$. If $\frac{a-d}{b-c} > x$ for all such a , b , c , and d , what is the maximum value of x ?
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Answers

- 4-1. 3969
4-2. 70
4-3. 200π
4-4. 42
4-5. $\sqrt{3}/5$
4-6. 3 [Answers like 3.0, 3.00, or 3.000 should receive full credit.]