

ROUND #1

*Gainesville College
Mathematics Tournament
For Two-Year Colleges
April 3, 2004*

Electrical resistance in a wire is directly proportional to its length and inversely proportional to the square of its diameter. If a 10 centimeter long wire with a diameter of 2 centimeters has resistance 600 ohms, find the resistance of a 15 centimeter long wire with a diameter of 5 centimeters.



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ROUND #2

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In a survey of 200 undergraduate math majors at a certain college, the following information is obtained about the courses they are taking during spring semester:

- 81 are enrolled in Real Analysis
- 88 are enrolled in Differential Equations
- 96 are enrolled in Linear Algebra
- 22 are enrolled in both Real Analysis and Linear Algebra
- 28 are enrolled in both Real Analysis and Differential Equations
- 38 are enrolled in both Differential Equations and Linear Algebra
- 20 are not enrolled in any of these three courses

How many of the students surveyed are enrolled in all three of these courses?

ROUND #3

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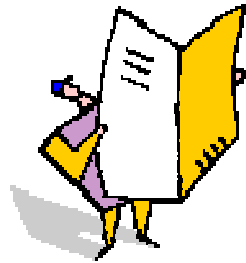
Solve for x :

$$3 = \sqrt{1+2 \cdot \sqrt{1+3 \cdot \sqrt{1+4 \cdot \sqrt{x}}}}$$

ROUND #4

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A piece of paper is 0.04 inch thick. Each time the paper is folded in half, the thickness is doubled. If the paper could be folded in half 12 times, how thick would the folded paper be? Give an exact answer or an approximation to the nearest foot.



ROUND #5

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If $2004_{\text{base } 10} = 432_{\text{base } x}$, then find x , where x is a whole number.

ROUND #6

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A license plate is created by using three copies of the same letter chosen from the list below and any three numerals.



Let the consonants be worth 2 points each and the vowels be worth 1 point each. Numerals are assigned a point value according to their number. For example a 9 is worth 9 points.

The value of a license plate is the sum of the points from its letters and consonants.

Use the license plate at right to see how the value of a license plate is figured: Being consonants, each letter is worth 2 points. The numerals are worth 3, 4, and 5 points, respectively. Adding these point values together, the license plate at the right is worth 18 points.



Find the number of possible unique license plates which can have a point value of 32.

ROUND #7

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Sally, George and Frank were picking up their fast food orders: chicken tenders, whole granola, and a deluxe hot dog. "Who ordered what?" asked the man at the counter. George said, "I didn't order the deluxe hot dog." The boy who ordered the whole granola said, "Oh, I thought you did." That was all the man at the counter needed to know. Who got each order?



ROUND #8

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Mr. Johnson's students often ask him how many points they need to get on the final exam in order to get a certain grade.

Here is the information about grading in Mr. Johnson's classes:

His students have 4 tests and each test counts as 15% of their grade, so 4 tests count as 60%. The final exam counts as 30%, and homework (4 assignments) counts as 10%. To make the situation even more complicated (but better for the students), he replaces the lowest test score by the score of the final exam, if the score of the final exam is higher.

4 Tests ----- 60%
Final Exam ----- 30%
Homework ----- 10%

One student in his class earned the following points (out of 100):

4 Tests: 67, 75, 90, 84
Homework: 80, 90, 87, 93

What is the lowest score (from 0 to 100) he needs to make on the final exam to get at least a B in the class ($\geq 80\%$)? Round the number of points to the nearest integer satisfying the conditions.



ROUND #9

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Find the sum of the solutions to the equation $|2x - 4| = 1$.

ROUND #10

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Jerry's Pizza Parlor wants to sell circular pizzas and square pizzas. How long should the diagonal of each square pizza be in order to have the same area as a 16-inch diameter circular pizza? Approximate your answer to the nearest tenth.