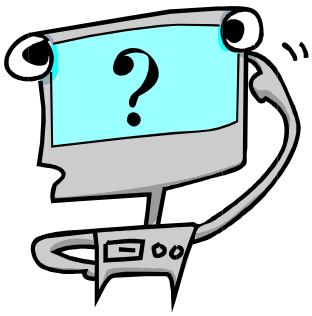
ROUND #1

Gainesville State College
Mathematics Tournament
April 8, 2006



The sum of the first 90 positive even integers minus the sum of the first 90 positive odd integers is equal to ?

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ROUND #2

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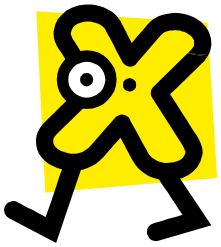
Find x, if $\dfrac{25}{1+\dfrac{3}{3+\dfrac{x}{4}}}=13$.



ROUND #3

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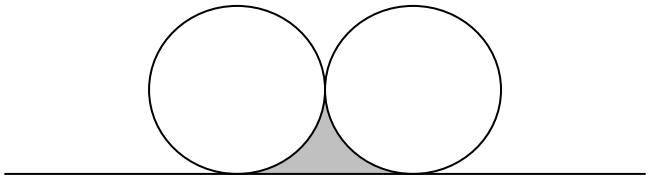
Two circles of radius 1 are tangent to each other and to a line as shown.

What is the radius of the largest circle that will fit in the shaded area?



ROUND #4

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The manager of an 80-unit apartment complex knows from experience that at a rate of $300 all the units will be full. On average, one additional unit will remain vacant for each $20 increase in rent over $300. Furthermore, the manager must keep at least 30 units rented due to other financial considerations. Currently, the revenue from the complex is $35,000. How many apartments are rented?

ROUND #5

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If all possible permutations of the letters in the word MATH are listed in alphabetical order, where does the word MATH appear on the list?

ROUND #6

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A non-square rectangle is inscribed in a 3 *inch* by 3 *inch* square so that each vertex of the rectangle is at a one-third point on a different side of the square. Find the area of the rectangle.

ROUND #7

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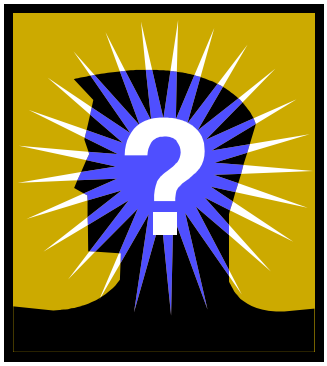
Let C be the portion of the graph of $y = 1 - x^2$ with $0 \le x \le 1$, and let C' be the reflection of C around the line $y = x$. How many points are there in the intersection of C and C'?



ROUND #8

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Solve the equation (give all answers): $\log_{64} x - \log_{x} 64 = \frac{5}{6}$

ROUND #9

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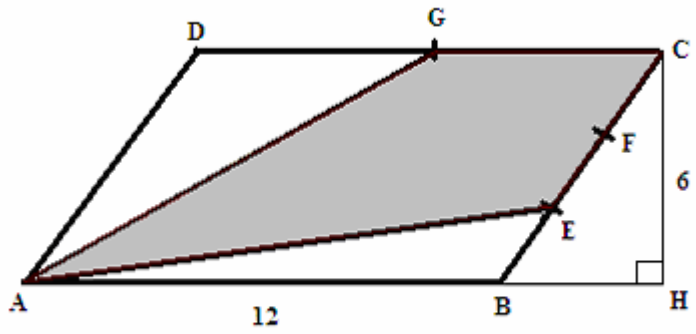
Find the area of the shaded region in the parallelogram ABCD. Assume that BE = EF = FC, DG = CG, AB = 12, and CH = 6.



ROUND #10

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Find one set of distinct values of the integers a, b, c, and d where $a > b > c > d > 0$ such that $a^3 + d^3 = b^3 + c^3 = 1729$.