

Question #0
Theta Ciphering
MAΘ National Convention 2007

Evaluate: $\sum_{i=1}^{9999} \log\left(\frac{i}{i+1}\right)$

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Question #1

Theta Ciphering

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The function $f(x) = x^3 + 15x^2 + 39x - 55$ has roots $r, s,$ and $t,$ and $r > s > t.$

Find the value of $3r + s - 5t.$

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Question #2

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Given that $5x \log(5x \log(5x \log(\dots))) = 100$,
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Question #3

Theta Ciphering

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Given that $i = \sqrt{-1}$, $\frac{31-5i}{2-5i} = a+bi$,
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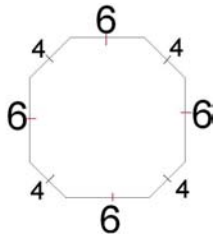
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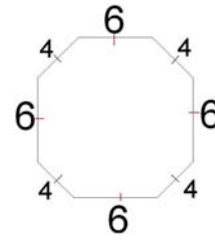
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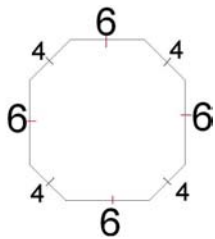


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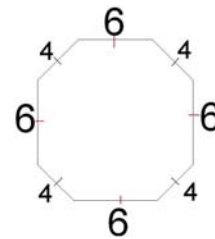


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Question #5

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Given that p is a prime number, $p > 3$,

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Given that $f(x) = \frac{ax^2 + b}{x^4 + c}$ and that

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What is the determinant of the matrix A^2

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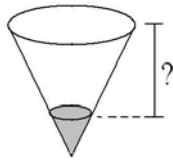
Question #10

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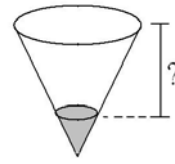
MAΘ National Convention 2007

A cup is in the shape of inverted (point-down) right circular cone whose height is 10 cm and has

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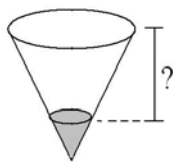


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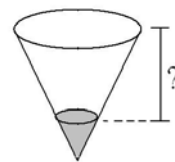


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