

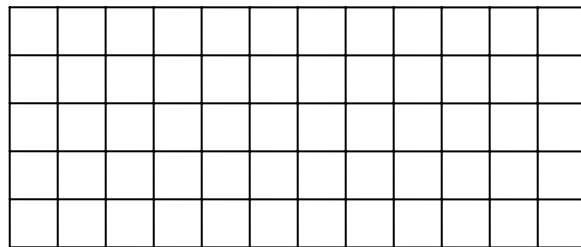
Mu Alpha Theta National Convention: Seattle, 1997
Theta CIPHERING Test

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1. A real infinite geometric sequence has a third term equal to 8, and a seventh term equal to $\frac{1}{2}$.
What is the sum of the sequence?

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2. How many squares are there in the figure?



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3. In his chemistry class, Mike is about to take his last test of the semester. If all tests are weighted equally, and Mike needs a 96% on this test to average 90% for the semester, but only 26% to average 80% for the semester, how many tests were there during the semester, including this one?

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4. Consider triangle ABC with vertices A(3, 4), B(7, 10), and C(11, 6). At what point is triangle ABC's circumcircle centered?

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5. If $x^2 + y^2 = 612$ and $xy = 144$, what is the smallest possible value for y?

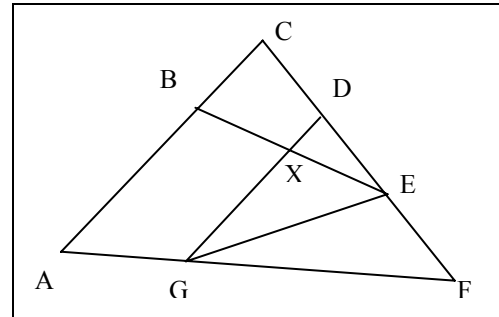
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6. What is the sum of x and y if x and y are rational and $2^x 3^y 6^x = 15552$?

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7. In triangle ACF , $AB = 2BC$, CF is trisected by points D and E , and $FG = 2GA$. What is the ratio of the area of triangle EGX to that of triangle ACF ?



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8. What is the probability that when a biased coin (the probability of heads is $\frac{2}{3}$) is flipped 5 times, you get at least 3 heads?

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9. Let B be a natural number. Let A be the number of factors of B . Let C be the number of zeros in which $B!$ ends when expressed in base 10. If A is odd and C is 8, what is the value of B ?

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10. A coin is flipped four times. Given that there were at least two heads, what is the probability that there were exactly 3 heads?