Bergen County Mathematics League

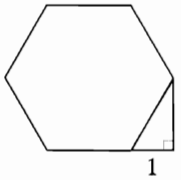
Good Luck To You

Good Luck To All

Contest #1 (No Calculators) **2009-2010**

Part I *Time Limit: 12 minutes* On contests #2, #4, and #6, ***any S.A.T. calculator will be allowed.***

1-1. The hypotenuse of a 30°-60°-90° triangle is one side of a regular hexagon, as shown. If the length of the shorter leg of the right triangle is 1, what is the perimeter of the regular hexagon?



1-2. What is the smallest positive integer greater than 3 which leaves a remainder of 3 when divided by each of 4, 5, 6, 7, and 8?

Part II *Time Limit: 12 minutes*

1-3. What value of a satisfies $27x^3 - 16\sqrt{2} = (3x - 2\sqrt{2})(9x^2 + 12x\sqrt{2} + a)$?

1-4. If the first 25 positive integers are multiplied together, in how many zeroes does the product terminate?

Part III *Time Limit: 12 minutes*

1-5. What is the smallest positive number x for which $(16^{\sqrt{2}})^x$ represents a positive integer?

1-6. Of the pairs of positive integers (x,y) that satisfy $3x+7y = 188$, which ordered pair has the least positive difference $y-x$?

***Notice*: A question on the next meet will repeat the theme of question 1-2.**

Answers

1-1. 12

1-2. 843

1-3. 8

1-4. 6

1-5. $\frac{\sqrt{2}}{8}$ or $\sqrt{\frac{1}{32}}$ or $\frac{1}{4\sqrt{2}}$ or exact equivalent

1-6. (16,20)