Bergen County Mathematics League

Good Luck To You — Good Luck To All

Contest #5 (No Calculators) — **2007-2008**

Part I *Time Limit: 12 minutes*

On contest #6, ***any S.A.T. calculator will be allowed.***

5-1. If the area of a circle's inscribed square is 60, what is the area of its circumscribed square?

5-2. What are all values of x for which $\log_x \sqrt{x+12} > 1$?

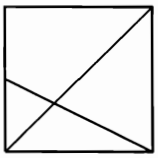
Part II *Time Limit: 12 minutes*

5-3. Determine the units' digit of the sum $0! + 1! + 2! + \ldots + n! + \ldots + 20!$

5-4. What is the area of a trapezoid the lengths of whose bases are 10 and 16 and the lengths of whose legs are 8 and 10?

Part III *Time Limit: 12 minutes*

5-5. A diagonal of a square intersects a segment that connects one vertex of the square to the midpoint of an opposite side, as shown. If the length of the shorter section of the diagonal is 2, what is the area of the square?



5-6. What real value of x satisfies $\sqrt{5x} - \sqrt{2x} = 5 - 2$?

***Notice*: One question next meet repeats the theme of 5-1. Another uses the diagram of 5-5.**

Answers

5-1. 120

5-2. (1,4) or $\{x|1 < x < 4\}$ or equivalent conjunction

5-3. 4

5-4. 104

5-5. 18

5-6. $7 + 2\sqrt{10}$