Bergen County Mathematics League

Good Luck To You

Good Luck To All

Contest #1 (No Calculators) **2015-2016**

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

1-1. What is the only solution of

$$(x - 2015)(x - 2016) = (x - 2016)(x - 2017)?$$

1-2. What is the area of the triangle bounded by the graphs of

$$y = 2x + 8,\ y = -x + 32, \text{ and } y = -20?$$

Part II *Time Limit:* 12 *minutes*

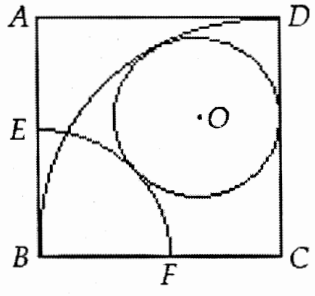
1-3. What is $m\angle A$ if $\angle B$ is complementary to $\angle A$ and supplementary to $\angle C$, $m\angle C + m\angle D = 360$, and $m\angle D = 8m\angle A$?

1-4. For how many of the integers from 100 to 999 inclusive is the product of its tens digit and its hundreds digit equal to its units digit?

Part III *Time Limit:* 12 *minutes*

1-5. The first few terms of sequence S are 20, 4, 16, 37, ... If the sum of the squares of the digits of the nth term of S is the $(n + 1)$st term of S, what is the 2015th term of S?

1-6. The area of square $ABCD$ is 144. The respective midpoints of $\overline{AB}$ and $\overline{BC}$ are E and F, as shown. If B is the center of quarter-circle $\widehat{EF}$ and C is the center of quarter-circle $\widehat{BD}$, then how long is a radius of the circle centered at O that is tangent to $\overline{CD}$, $\widehat{EF}$, and $\widehat{BD}$, as shown?



Answers

1-1. 2016
1-2. 1452
1-3. 30 or 30°
1-4. 32
1-5. 145
1-6. 4.2