Bergen County Mathematics League

Good Luck To You

Good Luck To All

Contest #5 (No Calculators) **2014-2015**

Part I *Time Limit: 12 minutes*

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

5-1. What are the coordinates of P', the image of $P(-\sqrt{2},\sqrt{2})$ under point reflection about (2,1)?

5-2. What are all values of x which satisfy $\log_{3-x}(x+1) = \log_{3-x}(x+1)$?

Part II *Time Limit: 12 minutes*

5-3. What are all ordered pairs of integers (m,n), with $m > n > 0$, which satisfy $\frac{1}{m} + \frac{1}{n} = \frac{1}{9}$?

5-4. What are all real values of x for which $\frac{x^2-9}{x^2-4} = 1 - \frac{5}{x^2-4}$ is an integer?

Part III *Time Limit: 12 minutes*

5-5. The segment joining the centers of the circles $(x-5)^2 + (y-12)^2 = 16$ and $x^2 + y^2 = 9$ intersects the circles at points A and B. What is the value of AB?

5-6. A circle with circumference 1 is rolled once, without slipping, around the outside of an octagon with perimeter 10. How many revolutions does the circle make in its trip around the octagon?

***Reminder*: A question next meet will repeat the theme of question 5-4.**

Answers

5-1. $(4+\sqrt{2},2-\sqrt{2})$

5-2. $\{x \mid -1 < x < 3, x \neq 2\}$ or exact equivalent

5-3. (90,10), (36,12)

5-4. $\pm\sqrt{3}, \pm\sqrt{5}, \pm 3$

5-5. 6

5-6. 11