

"Math is Cool" Championships – 2014-15  
9th & 10th Grade – October 22, 2014

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SCHOOL NAME \_\_\_\_\_ Team # \_\_\_\_\_

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Proctor Name \_\_\_\_\_ Room # \_\_\_\_\_

**Team Contest – Score Sheet**

**TEAM TEST - 15 minutes – 30% of team score**

*When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as **1 or 0**. Record all answers on the colored answer sheet.*

**DO NOT WRITE IN SHADED REGIONS**

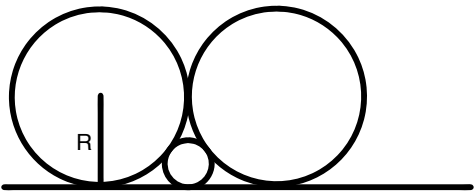
	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

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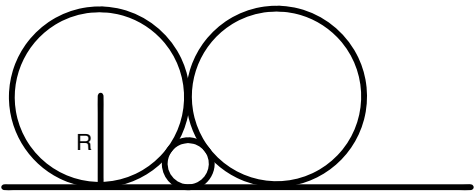
1	The symbol $\Pi$ stands for product. Evaluate: $\prod_{k=2}^{2014} \left(1 - \frac{1}{k}\right)$
2	A car's license plate consists of three distinct letters of the 26 possible letters followed by four distinct digits. How many possible different plates are there?
3	Two distinct circles each with radius, $R$ , are tangent to each other and separately to a line. A third circle is tangent to each other two and to the line. What is the radius of the smaller circle in terms of $R$ ? 
4	Find the solutions of the equation $x^3 - 4x^2 - x + 4 = 0$ .
5	Find the number of lattice points in the first quadrant of the Cartesian Plane that are on the line with equation $x + 4y = 128$ . A lattice point is a point with integer coordinates.
6	The degree measure of an interior angle of a regular polygon is 24 degrees more than 38 times the degree measure of an exterior angle of the polygon. How many sides does the polygon have?
7	Let $i = \sqrt{-1}$ . Simplify the following in the form $a + bi$ : $\frac{(1 + i)^2(3 - i)}{2 - 2i}$
8	Richard chooses five distinct elements from the first seven smallest positive integers. If Richard tells Stacey the product of the numbers he chose, Stacey would not be able to tell whether the sum of Richard's chosen numbers was even or odd. What is the product of the numbers Richard chose?
9	Evaluate: $1 + \sqrt{(23)(24)(25)(26) + 1}$
10	What is the sum of the integers, $n$ , such that: $\frac{n^2+n-8}{n+4}$ is also an integer?

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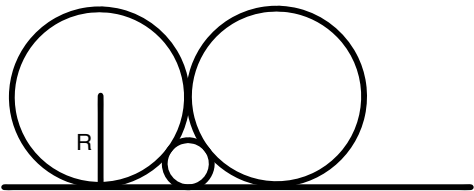
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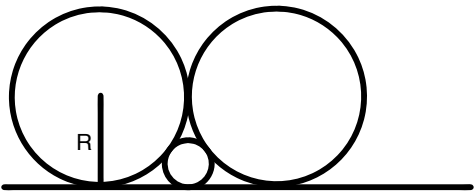
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