

2016 Math League Summer Tournament

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

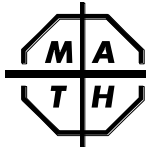
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July, 2016

Relay Questions for Grades 6 & 7 Calculators are PROHIBITED

Relay Round # 1

- 1-1. For what value of x is $(2^{12})(4^2) = 16^x$?
- 1-2. Let $n = \text{TNYWR}$. Math books were originally sold for $\$(n + 11)$ each. After buying 10 math books, John received a 20% discount for each additional math book purchased. If John paid a total of \$246 for all the math books he bought, how many books did John purchase at the discounted price?
- 1-3. Let $n = \text{TNYWR}$. How many positive integers are divisors of $3n^2$?
- 1-4. Let $n = \text{TNYWR}$. How many non-congruent triangles with integer side-lengths and perimeter $(n + 1)$ have no two sides of equal length?
- 1-5. Let $n = \text{TNYWR}$. If the mean (arithmetic average) of $(n + 7)$ and m is 50% greater than m , what is the value of m ?



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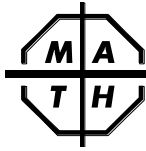
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Relay Round #2

- 2-1. How many degrees does the hour hand of a circular clock move in 10 minutes?
- 2-2. Let $n = \text{TNYWR}$. The value of my stocks increased by $10n$ percent in 2014, but then decreased by $10n$ percent in 2015. Over those 2 years together, the original value of my stocks decreased by $x\%$. What is the value of x ?
- 2-3. Let $n = \text{TNYWR}$. For what value of x does $|x - 17| = |x + n|$?
- 2-4. Let $n = \text{TNYWR}$. If the perimeter of an isosceles right triangle is $8 - n\sqrt{2}$, what is the length of a leg of this triangle?
- 2-5. Let $n = \text{TNYWR}$. For how many positive integers $a < 100$ does the equation $nx + 2y = a$ have at least one pair of integral solutions (x, y) ?



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Relay Round #3

- 3-1. If a and b are positive integers and $\frac{2}{5} = \frac{1}{a + \frac{1}{b}}$, what is the value of b ?
- 3-2. Let $n = \text{TNYWR}$. What is the smallest positive integer a for which $4an$ is both the square of an integer and divisible by 5?
- 3-3. Let $n = \text{TNYWR}$. The sum of the first $n - 2$ positive integers is subtracted from the sum of the first n positive integers. What is the numerical value of this difference?
- 3-4. Let $n = \text{TNYWR}$. How many perfect square integers between 1000 and 10 000 have the same tens and units digits as n ?
- 3-5. Let $n = \text{TNYWR}$. How many different ordered pairs of real numbers (x, y) satisfy $|x^2 - 5x + 6| + |y^2 - 4| = n$?