

Nassau County Interscholastic Mathematics League

Contest # 1 Answers must be in simplest exact form, unless otherwise noted 2005-2006
No Calculators

Problems 1-2 Time limit: 10 minutes.

1. Seven boys leave a group of boys and girls, after which the ratio of the number of boys to the number of girls is 5:4. Following this, 6 girls leave, and the ratio of the number of boys to the number of girls becomes 3:2. Find the number of boys in the original group.

2. Find all real values of x for which $8 - \left| \frac{1}{2}x \right| = |x - 2|$

Problems 3-4 Time limit: 10 minutes.

3. Mary traveled from Buffalo to New York City, and she returned to Buffalo by the same route. Her average speed for the round trip was 60mph. If she averaged 50mph from Buffalo to NYC, what was her average speed (in miles per hour) for the return trip to Buffalo?

4. If $x + \frac{6}{x} = 11$, find the value of $x^3 + \frac{216}{x^3}$.

Problems 5-6 Time limit: 10 minutes.

5. The mean of a set of 13 numbers is 21. When four consecutive integers are added to the set, the mean of the set of numbers is 27. Find the largest of the consecutive integers that was added to the original set.

6. Find the number of digits in the simplified value of the product $2^{37} \cdot 5^{63} \cdot 4^{18}$.

Answers:

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|----|----|----|-------------------------------------|
| 1. | 52 | 2. | $\left\{ -4, \frac{20}{3} \right\}$ |
| 3. | 75 | 4. | 1133 |
| 5. | 48 | 6. | 67 |