# Set Theory. Other Homework problems

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Teacher: If you were to add 87,326 and 139,561 — and then multiply by 8, add 9,182 and divide by 7, what would you get?
Student: The wrong answer.

Finish the problems from the class handout.

## Competition practice

**Exercise 1. 2002 AMC 12A, Problem 6.** For how many positive integers $m$ does there exist at least one positive integer $n$ such that $m \cdot n \leq m + n$?

**Exercise 2.** Calculate:

$$\frac{2\frac{3}{4}/1.1 + 3\frac{1}{3}}{2.5 - 0.4 \cdot 3\frac{1}{3}} / \frac{5}{7} - \frac{\left(2\frac{1}{6} + 4.5\right) \cdot 0.375}{2.75 - 1\frac{1}{2}}.$$

**Exercise 3. 2002 AMC 10A, Problem 17.** Sarah pours four ounces of coffee into an eight-ounce cup and four ounces of cream into a second cup of the same size. She then transfers half the coffee from the first cup to the second and, after stirring thoroughly, transfers half the liquid in the second cup back to the first. What fraction of the liquid in the first cup is now cream?

**Exercise 4. 2002 AMC 12B, Problem 1.** The arithmetic mean of the nine numbers in the set $\{9, 99, 999, 9999, \ldots, 999999999\}$ is a 9-digit number $M$, all of whose digits are distinct. What digits the number $M$ does not contain?

**Exercise 5. 2003 AMC 12A, Problem 2.** Members of the Rockham Soccer League buy socks and T-shirts. Socks cost $4 per pair and each T-shirt costs $5 more than a pair of socks. Each member needs one pair of socks and a shirt for home games and another pair of socks and a shirt for away games. If the total cost is $2366, how many members are in the League?

# Challenge Problems

**Exercise 6.** There are 2 hourglasses measuring 7 and 11 minutes respectively. How do you measure 15 minutes? Can you measure any number of minutes?

**Exercise 7.** Pooh forgot to wind up his grandpa's big clock and it stopped while he was sleeping. He knows that Piglet has a clock. How can he put the clock to the right time without moving any clocks around? We assume that they do not have telephones or radios.