

# Set Theory — 2

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## Class Discussion

AMC Strategy

## Warm Up

**Exercise 1.** Decode:

$$A + AB + ABC = BCB.$$

Every letter represents a different digit.

**Exercise 2. 2005 AMC 10B, Problem 2.** A positive number  $x$  has the property that  $x\%$  of  $x$  is 4. What is  $x$ ?

## Problem Set

**Exercise 3.** A farmer is to ferry across a river a goat, a cabbage, and a wolf. Besides the farmer himself, the boat allows him to carry only one of them at a time. Without supervision, the goat will gobble the cabbage whereas the wolf will not hesitate to feast on the goat. How can he accomplish his goal?

**Exercise 4.** What the smallest number of pencils you need to take in the dark from a box containing 7 red pencils and 5 blue ones, so that you will have at least two red and three blue pencils?

**Exercise 5.** A caterpillar started her project of climbing to the top of a tree on a Monday morning. She travels up for half a day, then she sleeps for twelve hours. During the day time she climbs 4 meters, and she slides 3 meters when she sleeps. When will she be at the top, if the tree is 12 meters high?

**Exercise 6.** Insert pluses in a row of 20 fives: 555...55, so that the sum is 1000.

**Exercise 7.** On Monday the baby said: A, on Tuesday AU, on Wednesday AUUA, on Thursday AUUAUAAU. What will he say on Saturday?

**Exercise 8.** Mike said to Bob: "Give me two dollars, and we will have the same amount of money." Bob replied: "No, you give me two dollars and I will have twice as much money as you." How much money does each of them have?

**Exercise 9.** I can fit two pancakes into my pan at the same time. I need to fry each pancake for two minutes on each side. What is the minimum time I need for frying 3 pancakes?

**Exercise 10.** Calculate:

$$\frac{(13.75 + 9\frac{1}{6}) \cdot 1.2}{(10.3 - 8\frac{1}{2}) \cdot \frac{5}{9}} + \frac{(6.8 - 3\frac{3}{5}) \cdot 5\frac{5}{6}}{(3\frac{2}{3} - 3\frac{1}{6}) 56} - 27\frac{1}{6}.$$

**Exercise 11. 2005 AMC 10B, Problem 6.** At the beginning of the school year, Lisa's goal was to earn an A on at least 80% of her 50 quizzes for the year. She earned an A on 22 of the first 30 quizzes. If she is to achieve her goal, on at most how many of the remaining quizzes can she earn a grade lower than an A?

**Exercise 12.** There are three athletes (Alex, Brook and Chris) and their individual coaches (Murphy, Newlyn and Oakley) standing on the shore. No coach trusts their athlete to be near any other coach unless they are also with them. There is a boat that can hold a maximum of two persons. How can the six people get across the river?