# Chapter 1 Test (*Problem solving*)

To prepare for Chapter 1 Test, make sure you know how to solve problems we discussed in class, identify strategies and **explain your solution**. You should be able to (1) solve problems using a strategy of your choice and (2) outline another solution of the same problem using a different strategy. For example, if you solve the „Bottle with a cap" problem by trial and error, you may suggest a different strategy – set up an equation. Write an equation that would solve the problem. (You do not have to solve the equation if you solved the problem differently).

Part 1: Word problems (texts are given below):

"Brick" problem
„Bottle with a cap" problem
"Weekdays" problem
"Bacteria" problem
"Emily spending and losing money" problem
"Sarah on a shopping spree" problem
"John enters a shop" problem

Make sure you go over all the problems we solved in class and you understand them thoroughly. You will not be given a completely new problems on the exam but also do not expect the exactly same problems we had in class. Be prepared for some variations – some values or minor parts will be changed but the context of the problem will be the same.

Examples of variations (answers are at the end of this study guide):

A brick problem can be possibly changed like this:
> *If a brick weighs 8 kilograms and a third of a brick, how much does a brick weigh?*

Bacteria:
> *A biologist notices that a certain bacterium splits into 10 separate bacteria once every minute. In 24 hours bacteria filled up the whole test tube. When was the test tube filled up to 1/10? When it was filled up to 1/100?*

Men digging a hole:
> *It takes one man one day to dig a 3m x 3m x 3m hole. How long does it take 4 men working at the same rate to dig a 6m x 6m x 6m hole?*

Shopping spree problem:
> *Stanley went to a store, spent 1/4 of his money, and then spent $90 more. He went to a second store, spent 1/4 of his remaining money, and then spent $90 more. When he left the second store, he had no money left. How much money did he have before he entered the first store?*

Etc.

Make sure that you have deep understanding of solving strategies. You do not have to memorize names of the strategies; you can use the handout on your test. **No handout sharing** – you must bring your own handout if you want to use it.

## Part 2: Algebra pieces (Algebra pieces or Cuisenaire Rods):

See problems on pages 19 - 23 in our book. (this includes #9 that we did not discuss but you should be able to do it). Make sure that you know how to solve these problems by manipulating algebra pieces. Do not use other strategies (only if you want to check your work).

Problems discussed in the class:

1. If a brick weighs 1 kilogram and half the brick, how much does the brick weigh?

2. A bottle with cap costs one dollar and ten cents. The bottle costs one dollar more than the cap. How much does the cap cost?

3. What day of the week was yesterday if five days before the day after tomorrow was Wednesday?

4. A biologist notices that a certain bacterium splits into 2 separate bacteria once every minute. In 24 hours bacteria filled up the whole test tube. When was the test tube half full?

5. Emily spent two thirds of her money. Then she lost two thirds of the money that was left. Four dollars remained. How much money did Emily have to begin with?

6. Sarah went to a store, spent half of her money, and then spent $10 more. She went to a second store, spent half of her remaining money, and then spent $10 more. Then she had no money left. How much money did she have in the beginning when she went to the first store?

7. John enters a shop and asks the proprietor: "If you give me the same amount of money I have in my pocket right now, I'll spend $100 in your shop." The proprietor agrees and John spends $100. John then enters the second shop and asks the proprietor: "If you give me the same amount of money I have in my pocket right now, I'll spend $100 in your shop." The proprietor agrees and John spends $100. The same situation repeats in the third shop. After John walks out of the third shop, he has no money left. How much money did he have to start with?

Solutions to problem variations on the previous page: Brick (12kg); Bacteria (23 hrs 59 min; 23 hrs 58 min); Shopping ($280).