Problems for November 21, 2009.

Calendar, time and age.

1.   The date "May 5, 1955" can be written as 5.5.55. Write down all dates of the 21st century which can be written using one digit.

2.   A parent has 5 sons. Each of them has 1 sister. How many children are there in the family?

3.   An office with soundproof walls and doors has an antique wall clock, which strikes once every half hour and also every hour (as many times as the hour hand shows). One day, while opening the door of the office, its owner has heard 1 strike of the clock. Half an hour later he heard another strike of the clock (just one). Another half an hour later he heard one more strike. Finally, yet another half an hour later he heard one strike again. What time did the clock show when the owner entered his office?
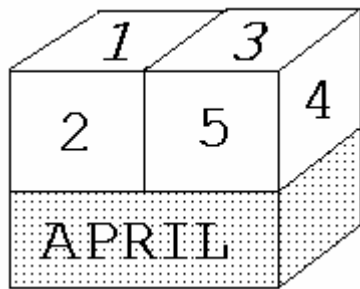
4.   A desk calendar has a base with the name of the month (which can be changed monthly), with two cubes standing on the base. Each face of both cubes has a digit on it (see the picture). By moving and rotating the cubes on the base it is possible to produce any date on the front side of the calendar. Draw the nets for these two cubes showing how the digits are arranged.

5.   Find the angle between the hour and the minute hands of a clock at 2:12 pm.

6.   On the 27th of August, when Alex turned one year, he found a jar with coins. Starting the next day he began to drop them behind the sofa: one coin on day 1, two coins on day 2, three coins on day 3 and so on. Every other day his parents returned two coins back to the jar. When Alex turned one year and one month, he dropped the last remaining coins behind the sofa, and after that the matter was forgotten. How many coins are now behind the sofa?

7.   Tom is looking at his digital watch and he has noticed something interesting: if one compares what the watch shows now with what Tom saw when he looked at his watch earlier, then the digits displayed remained in the same order, but one of them has disappeared. Moreover, if Tom had a clock with hands there would be no need to compare: it would show exactly the same thing as earlier. What is the time now?

Additional problems

8.   John decided to enumerate days in his own system: after the 4th day he now always has the 1st: 1, 2, 3, 4, 1, 2, … One particular day was the 3rd in his system and in the usual calendar. One month later it happened again. When is the nearest moment in the future when it will happen yet again?

9.   Two years from now my brother will be two times older than he was two years ago, and three years from now my sister will be three times older than she was three years ago. Which of them is older?

10.   When Clive came up to his grandfather's cuckoo clock on the wall, it showed 12 hours and 5 minutes. He started to move the minute hand clockwise until the hour hand has returned to its original

position. How many "cuckoos" did his grandfather hear during this time?

11.   A son of the professor's father is talking to the father of the professor's son, but the professor does not participate in the conversation. Is that possible?

Homework

1.   You have one sand clock which measures 7 minutes and another sand clock which measures 11 minutes. How can you use them to measure 15 minutes?

2.   Alex said: "The day before yesterday I was 10 years old, and the next year I will turn 13." When is Alex's birthday?

3.   Robert is 11 years old, and Josh is 1 year old. How old will Robert be when he becomes three times older than Josh?

4.   A boy has as many sisters as he has brothers. His sister has two times more brothers than she has sisters. How many boys and girls are there in the family?