

# SIMC 5th Grade Homework: Week 3

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## 1 Cutting a Cake

So what about the trimmings for the 3-person method? Come up with a fair way to divide them so that nobody is envious.

## 2 Speed Math: Multiplying Numbers Around 100

1.  $98 \times 103$
2.  $89 \times 106$
3.  $48 \times 97$
4.  $105 \times 108$
5.  $93 \times 94$
6.  $92 \times 111$

## 3 Rolling Boulders Up a Hill

1. Eho has to carry planks of wood up a hill to construct a gazebo. Unfortunately for him, Biff has had a very bad day, so he sabotages Eho's efforts. Eho can carry 1 plank up the hill every 2 minutes. Meanwhile, Biff carries 1 plank down the hill every 3 minutes, beginning from the time that Eho puts down the first plank at the top of the hill. How long will it take Eho to get his 20 planks of wood up the hill?
2. Penguins need to steal twine in order to create their nests. Penguins A and B can each steal 2 pieces of twine per minute in order to build their nest together. However, evil penguin C steals 1 piece of twine from their nest every minute. How long will it take penguins A and B to build a nest out of 6394527 pieces of twine?

- Eho is rolling a boulder up a hill. He can move it up 3 feet each day. Little does he know, Biff is not only pushing it down 1 foot per night, but Biff also chips off half the boulder each day. So, on the second day, Eho is only rolling half a boulder up a hill and is able to move it 6 feet, then Biff is able to push it down 2 feet... How long will it take Eho to move the boulder up a 500 foot cliff so that he can push it off the cliff and squash Biff?
- Eho, after reading "Math is Cool" problems, thinks that Biff is continually sabotaging his efforts. He decides to get revenge. Each day, Biff reads 20 pages of his cookbook and bakes 5 out of those 20 recipes. Each night, Eho flips back Biff's book 10 pages. On average, how many recipes out of 200 will Biff bake twice?

## 4 Roots of a Tree

- Factor  $x^2 - 16x + 64$
- Find the roots of  $x^4 - 2x^2 - 48$
- How can you express Pascal's Triangle using combinations?
- What does an entry in Pascal's Triangle really mean? How do you get to a particular entry in Pascal's?
- Fred works on a corner of a 5 by 7 grid. He can move 1 unit horizontally or vertically at a time. When he returns home, Fred must always be moving towards his house, which is at the opposite corner. How many ways are there to get there?
- How does the previous question relate to Pascal's Triangle?