

# SIMC 5th Grade Homework: Week 4

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## 1 Fun Math: Number Guessing Games

1. Here is Marsha's number game:

- Pick a number between 100 and 200
- Divide by 2.
- Add twice the number.
- Add one.
- Take the square root.
- Multiply by 4.
- Subtract twice the original number.

Marsha can then say the result. What is the result?

2. Create your own number game. What is the result?

## 2 Speed Math: Dividing to $n$ Decimal Points, Math Tricks

Calculate the following in your head:

- $87 \div 43$
- $91 \cdot 36$
- $45 \div 89$
- $56 \cdot 49$
- $77 \cdot 13$

Practice for Countdown Round (if you are participating next week).

## 3 A Style of Question: Long, Wordy,...Questions

1. Many people sing "100 bottle of beer on the wall, 100 bottles of beer. Take one down, pass it around, 99 bottles of beer on the wall..." Others sing songs about boxes of bombs, exploding pencils, etc. Person A has 100 bombs, 100 bottles of beer, and 100 pencils and wishes to make a pyramid (1 object in the top row, 2 in the bottom row...) with these objects. Person B then takes Person A's pyramid and rearranges it into a square pyramid (1 on the top row, 4, 9, 16...). How tall will Person B's pyramid be?

- Tomato A is very fond of making paper airplanes and Tomato B is equally fond of throwing them at Tomato A. In fact, the two tomatoes regularly engage in all-out paper airplane wars, even though they are actually "cooperating." In fact, Tomato A takes a 10 minute break every hour, an 8 hour break every day, a 2-day break every week, a week-long break every two months, and a three-month break every year. Meanwhile, Tomato B takes a 10 minute break every hour, an 8 hour break every day, a 2-day break every week, a week-long break every two months, and a three-month break every year. Overlapping breaks only count once. Tomato A can make a paper airplane every 2 minutes and Tomato B can throw a paper airplane every 1.5 minutes. If Tomato A starts with 1032874 paper airplanes pre-made, how many hours of actual throwing will it be before Tomato B runs out of paper airplanes to throw? (Round your answer to the nearest hour.)

## 4 The Unpower of Pi

- The space diagonal of a cube is  $3\sqrt{3}$ . What is the volume of the cube?
- What is the length of the space diagonal of a cube with dimensions 3, 4, and 12?
- In a circle, chords AB and CD intersect at E.  $AB=12$ ,  $CE=4$ , and  $DE=5$ . What are the possible lengths of AE?
- Points A, B, C are located on a circle.  $\angle ABC=40^\circ$  and  $\angle BAC=100^\circ$ . What is the measure of angle ACB?
- Find the areas of the shaded portions of the given diagrams.
- Find all possible lengths of segments in the given diagrams.

## 5 $2 = (4, 5)$

- Find the midpoint of (4,7) and (16,-3).
- Find the length of the segment with endpoint (4,7) and midpoint (17,23).
- A 8x12 piece of paper is folded so that two opposite corners meet. What is the length of the fold?