Instructions:

“Each of you will receive a note card. On it is a problem to compute. Before you get your card, I need to give you some restrictions.

\*You do not necessarily need to compute an exact value.

\*You may not use a calculator (or phone or any electronic device).

\*You may not calculate using any standard algorithm.

\*You may not use any magical “shifting of decimal points”.

\*What you can do is round, estimate, and think about the meaning of the numbers and the operations.

When you first get your card, I’d like you to try to figure out the calculation without writing, using only your mental math abilities. After you think you know your estimated answer, please write answers to the questions on the accompanying sheet. After everyone has some time to think individually and write, I’ll give you the next instruction. What questions do you have for clarity?”

(pass out cards, and work time)

“Now that you’ve had some time to think alone, turn to your neighbors and talk about your reaonsing.”

(give time for discussion)

“Your next challenge is for you to all stand up and arrange yourselves in a long line, standing shoulder to shoulder, so that the values of your computations go from least to greatest. Since everyone must be in the line, this will take some communication. Some comparisons might be easy, others might not be. You will definitely need to talk!! When everyone thinks you are ordered, I’ll give the next instruction. What questions do you have for clarity?

(give time for participants to arrange themselves)

“Now that you all think you are arranged from least to greatest, look on the back of your card. You should see a number. We are going to start with the person standing at the beginning of the line (least value from the computation cards) and have you read your number. Listen, and then be ready to make a guess about what you hear. Also, I will be able to tell you if as a group you have made any errors!”

(read, reveal that the numbers are the first 20 (21) digits of pi, and identify any cards that are out of order.

What estimated value did you get for your computation?

Write in words how you figured that.

Do you think your estimation is high or low? How much? Why?