Number Tricks and Deductive Reasoning Exercise   NAMES:

Turn in one paper per group but be sure all members of the group have seen the final answers. Circle your name if the paper that gets turned in is your copy.

The following are selected questions from the book *Mathematics: A human endeavor* by Jacobs (section 1.6 exercise set). Information and questions in square brackets have been added by me; please answer all questions.

[Below is a number trick that we want to investigate.]

> Choose any two-digit number.
> Multiply it by 13.
> Multiply the result by 21.
> Multiply the result by 37.

1-2. Do this trick with [two different] two-digit numbers. Show all of the steps.

3. What do you notice about the results?

4. Find $13 \times 21 \times 37$.

5. Why does this trick work?

Here is an old trick with numbers that has been used in magic shows. A variation of it was included in a book written by the New York magician Al Baker in 1923 that sold for $50 at the time.

>Write down the year of your birth.
>Write down a year in which an important event in your life occurred.
>Write down your age as of the last day of the current year.
>Write down the number of years since the important event occurred.
>Add the four numbers together.

6. Try this out. Show your work. What is the result?

7. If possible, try it on someone else. If possible, choose someone who is not your age. What is the result?

If the steps are carried out correctly, the result can be correctly predicted without knowing any of the four numbers.

8. How do you think it is possible? (In other words, what do you suppose is special about the result?)

9. Can you explain how the trick works?