Homework for Dr. Z.'s MathHistory for Lecture 11 (Due March 9, 2017)

0. Read and understand Chapter VI, sections 5-7 (pp. 141-154), summarize its content in your own words, and your own handwriting, and write it in your **HISTORY** notebook, [You should have at least the equivalent of two typed pages, but you are welcome to write more]

1. Use Cardano's method to find all the three roots of the cubic equation

$$x^3 - 9x - 28 = 0 \quad .$$

Reminder: If u and v are the two numbers found by Cardano's method, then the three roots of the cubic are

$$u + v \quad , \quad \omega u + \omega^2 v \quad , \quad \omega^2 u + \omega v \quad ,$$

where $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$ and $\omega^2 = -\frac{1}{2} - i\frac{\sqrt{3}}{2}$, are the complex cubic-roots of 1.

2. Use Cardano's method to find all the three roots of the cubic equation

$$x^3 - 30x - 133 = 0 \quad .$$

(See above reminder)

3. Use Cardano's method to find all the three roots of the **general** cubic equation

$$x^3 + px + q = 0 \quad ,$$

where p and q are arbitrary numbers, in other words, derive a **formula** for the three roots.

4. Find a reduced cubic that would enable you to solve the non-reduced cubic

$$x^3 + 3x^2 + 5x - 100 = 0 \quad .$$

[**Reminder**: if the cubic starts with $x^3 + ax^2 + \ldots$, then the change of variable is $y = x + \frac{a}{3}$. Use this to get an equation for y.]