Homework for Dr. Z.'s MathHistory for Lecture 5

0. Read and understand Chapter III, sections 5-15 (pp. 50-80), 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

The other problems should be either hand-written or typed and sent as .pdf file or .txt file (PLEASE no other formats) to DrZlinear@gmail.com by 8:00pm Sunday, Sept. 26, 2021 ,

Subject: hw5

with an attachment: hw5FirstLast.pdf (or hw5FirstLast.txt)

Also in the BODY of the homework, have your name and indicate whether it is OK to post the homework in my web-site.

1. With square-paper (you can download it), glue, cardboard, ruler, and scissors, construct a nice **proof kit** for the First Proof of the Pythagorean theorem

(using the decomposition of an $(a+b)\times(a+b)$ square in two different ways: $a^2+b^2+4\cdot(ab/2)$ and $c^2+4\cdot(ab/2)$, with $a=12$, $b=5$ $c=13$ spacings.

Really understand this proof, and be able to repeat it in a quiz or test, even without this kit, but drawing the diagrams.

2. With square-paper (you can download it), glue, cardboard, ruler, and scissors, construct a nice **proof kit** for the Second Proof of the Pythagorean theorem, using the idea of *similar triangles.*

Use $a=12, b=16, c=20$ spacings for the main triangle.

Really understand this proof, and be able to repeat it in a quiz or test, even without this kit, but drawing the diagrams.

3. Using $a=2mn, b=m^2-n^2, c=m^2+n^2$, find as many Pathagorean triples as you can with $a=120$. Which ones are **primitive**?

4. Prove that there are infinitely triples of **positive** integers a, b, c such that

$$a^2 + b^2 = c^2 \quad .$$

5. Who first proved that there are no solutions, in **positive** integers a, b, c, of the equation

$$a^4 + b^4 = c^4 \quad .$$

6. Who first proved that there are no solutions, in **positive** integers a, b, c, of the equation

$$a^3 + b^3 = c^3 \quad .$$

7. Who first *thought* that he has a proof that, for any integer $n \geq 3$, there are no solutions, in **positive** integers a, b, c, of the equation

$$a^n + b^n = c^n \quad ?$$

8. Who first actually had a proof that, for any integer $n \geq 3$, there are no solutions, in **positive** integers a, b, c, of the equation

$$a^n + b^n = c^n \quad ?$$