**History of Mathematics -- Exam # 1**

**Name: .**

**Part 1: Definitions**

Define the terms below, ensure that each definition only uses terms available in the year indicated.

1. (5 pts) Commensurable (500BC):
2. (5 pts) Composite: (300 BC):
3. (5 pts) Even (300 BC):
4. (Extra Credit - 5 pts) Transcendental number (current) :

**Part 2: Questions**

1.(10 pts) Use the Euclidean Algorithm to find the GCD(X,Y).

2. (10 pts) Name the five regular solids (with the proper name and the number of faces).

1. Why can there be no more than five solids? Explain well.

3. (10 pts) Suppose we wanted to take successive powers of 9… (, …) until we reach some number, N, ending in zero. Does N exist?

* If so, what power of 9 is necessary to reach this number?
* If not, how can we reach this conclusion without calculating N?

4. (10 pts) In Book XII of the *Elements*, Euclid uses Eudoxus method of exhaustion to draw what conclusion about the volume of a cone?

* In modern, algebraic, terms, what does this formula look like?

**Part 3: Formal Proofs**

**Please write each proof as formal as necessary. Explain well, give details.**

1.(15 pts) Prove the Pythagorean theorem, please state the mathematician and century it was proven.

2.(15 pts) Prove that there are infinitely many prime numbers. Who proved this fact for the first time?

Please prove in such a way that the mathematician would have.

3. (15 pts) Finish this statement, “If p is prime, and p divides evenly the product of a and b, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”.

1. Who first proved this?
2. Prove this statement. Please prove in such a way that the mathematician would have.