Math 406, Spring 2021
HW09, due Wednesday, May 5 at 5pm [1]

Reading: Read Chapters 8 and 9 of Crisman's text.

Graded Problems: Work the following problems for a grade. Turn them in on Gradescope.

Some problems are taken from the Online Version of Crisman's text:

`http://math.gordon.edu/ntic/`

Each problem is worth 25 points.

1. Let p be an odd prime and let k be a positive integer. Suppose r is a primitive root modulo p^k. Show that either r or $r+p^k$ is a primitive root modulo $2p^k$.

2 (Crisman 3.6.18)**.** Suppose (x,y,z) is a primitive Pythagorean triple with x odd and $x,y,z>0$. We already saw that this implies that y is even. Show that, in fact, y is divisible by 4.

3 (Crisman 3.6.22)**.** Show that

$$\gcd(x,y)^2 = \gcd(x^2,xy,y^2).$$

4 (Crisman 16.8.8)**.** Suppose p is an odd prime. Show that

$$\sum_{a=1}^{p-1}\left(\frac{a}{p}\right) = 0.$$

[1] This version created Tuesday 27th April, 2021 at 21:43.