Copying answers and steps is strictly forbidden. Evidence of copying results in zero for copied and copier. Working together is encouraged, share ideas not calculations. Explain your steps. This sheet must be printed and attached to your assignment as a cover sheet. The calculations and answers should be written neatly on one-side of paper which is attached and neatly stapled in the upper left corner. Box your answers where appropriate. Please do not fold. Thanks!

Problem 1 Your signature below indicates you have:

(a.) I read pages 1-42 of Stillwell's *Elements of Number Theory*: _____.

Problem 2 Use Fibonacci's algorithm to find an *Egyptian representation* of 5/43. Show your work.

Problem 3 exercise 1.2.2 on page 5.

Problem 4 Wildstyle works at an awesome coffee shop sells discount coffee in two sizes: *Jabba* and *Throatwoblermangrove*. She sells *Jabba* for 31 dollars each and *Throatwoblermangrove* for 28 dollars each. If her total revenue from a day is 1460 dollars, how many of each size coffee might she manufacture in a day?

Problem 5 exercise 1.4.2 on page 8.

Problem 6 exercise 1.5.1 on page 11.

Problem 7 exercise 1.5.3 on page 11.

Problem 8 exercise 1.5.4 on page 11.

Problem 9 Show that x such that $x^2 + (161)^2 = (289)^2$ is divisible by 60.

Problem 10 Find the continued fraction of 5/43. I probably shouldn't tell you this, but, See page 96 of this free legal pdf by Stein no joke

Problem 11 exercise 2.3.1 on page 28. You might use Sage to check your answer as shown on page 33 of this free legal pdf by Stein no joke

Problem 12 exercise 2.5.1 on page 32.

Problem 13 exercise 2.5.7 on page 33.

Problem 14 exercise 2.6.2 and 2.6.3 on page 35

Problem 15 exercise 2.6.4 on page 35

Problem 16 extend the map one more step beyond what is pictured on page 38.

Problem 17 Let $m, a, b \in \mathbb{Z}$ such that $m \neq 0$. **Prove:** $a|b$ iff $ma|mb$.

Problem 18 Let $a, d \in \mathbb{Z}$. **Prove:** if $d|a$ then $|d| \leq |a|$.

Problem 19 Suppose $a, b, c \in \mathbb{Z}$ and $a, b, c \geq 0$. **Prove or disprove the claim below:** If $a|(b+c)$ then $a|b$ and $a|c$.

Problem 20 Prove the square of every odd integer is of the form $8k+1$ for some $k \in \mathbb{Z}$.