## Section 4- Integers (114 points)

To receive credit, you must show your work on the worksheet.

1. (15 points) Express a in terms of b using the division algorithm:

a = bq + r (remainder must be positive)

To receive credit, you must show your work.

a. (5 pts) a = 916, b = 7

b. (5 pts) a = -201, b = 13

c. (5 pts) a = 1335, b = 5

- 2. (20 points) Compute using modular arithmetic (positive remainders only) *To receive credit, you must show your work.* 
  - a. (6 pts) 203<sup>5</sup> mod 9

=



b.  $(6 \text{ pts}) (59^3 + 1301^3) \mod 27$ 



c. 
$$(8 \text{ pts}) (451 + 301 * (-70) - 2154) \mod 43$$



3. (19 points) What is the prime factorization of the following? *To receive credit, you must show your work.* 

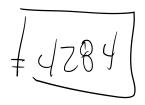
b. (4 pts) 620

c. (5 pts) 993 \* 580

d. 
$$(6 \text{ pts}) 25^2 * 12^3$$



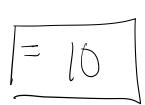
- 4. (20 points) Find the following *To receive credit, you must show your work.* 
  - a. (5 pts) LCM(21, 612)



b. (5 pts) LCM(1012, 150)



c. (5 pts) GCD(190, 670)



d. (5 pts) GCD(1215, 7875)



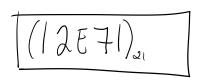
- 5. (20) For the following pair of numbers, find the GCD and then use Euclid's algorithm to express the GCD as a linear combination of the two numbers.

  To receive credit, you must show your work.
  - a. (20 pts) 190 and 100

10=(2)100+(-1)190

So \(\sigma = -\), \(\int = Z\)

- 6. (20 points) Convert the following numbers < bases above 16 continue the letter format of Hexadecimal> To receive credit, you must show your work.
  - a. (6 pts) 219325<sub>10</sub> to base 21



b. (6 pts) 112102<sub>3</sub> to base 10



c.  $(8 pts) (1111011_2 + 1010000_2)$  to base 4

(3023)4