

COT 3100 Fall 2020 Homework #4
Please Consult WebCourses for the due date/time

- 1) Find all integer solutions to the equation $1326x + 348y = 18$.
- 2) (a) Find all integer solutions to the equation $161x + 71y = 1$.

(b) Find all integer solutions to the equation $161x + 71y = 15$.

(c) Find $71^{-1} \pmod{161}$. (Note: Answer must be in between 0 and 160, inclusive.)
- 3) Let $a = 2^5 3^6 5^2 7^3$, $b = 2^4 3^3 5^8 11^2$, and $c = 2^7 3^7 5^5 11^8$. Determine, in prime factorized form, both $\gcd(a, b, c)$ and $\text{lcm}(a, b, c)$.
- 4) For the numbers a , b and c listed in problem 4, determine the number of divisors each of those numbers has.
- 5) How many zeroes are at the end of $\frac{2000!}{500!1500!}$?
- 6) Prove for positive integers a and b with $a > b$, that $\gcd(a, b) = \gcd(a-b, b)$. One way to prove this is to show that any common divisor of a and b is also a common divisor of $a-b$ and b , AND to show that any common divisor of $a-b$ and b is also a common divisor of a and b . (This proves that the two pairs of numbers have the same set of common divisors, which, in turn, proves that the greatest common divisors have to be the same.)
- 7) Give a summary of the academic contributions of Dr. Ron Rivest, a computer scientist. Be sure to include information about RSA encryption in your write up. Please aim for a length of roughly 200 - 400 words. **Your summary must be typed.** Please state the sources you used in writing your summary.