Name:	
MATH 308 Fall 2021 HW 14: Due 11/22	"If you're going to do something tonight that you'll be sorry for tomorrow morning, sleep late." —Henny Youngman

Problem 1. (10pt) Do there exist integers a,b such that 2a+3y=5? Explain. Do there exist integers x,y such that 8x+12y=3? Explain.

Problem 2. (10pt) Compute $gcd(2^8 \cdot 3^5 \cdot 7^{10} \cdot 11 \cdot 19^6, 2^5 \cdot 3^8 \cdot 5^3 \cdot 11^2 \cdot 13 \cdot 17^3)$.

Problem 3. (10pt) Compute $lcm(2^8 \cdot 3^5 \cdot 7^{10} \cdot 11 \cdot 19^6, 2^5 \cdot 3^8 \cdot 5^3 \cdot 11^2 \cdot 13 \cdot 17^3)$.

Problem 4. (10pt) Prove that if $a,b \in \mathbb{Z}$, then $ab = \gcd(a,b) \cdot \operatorname{lcm}(a,b)$.

Problem 5. (10pt) Use the Euclidean Algorithm to compute gcd(36, 98).

Problem 6. (10pt) Use the Euclidean Algorithm to find integers x, y such that $36x + 98y = \gcd(36, 98)$.