

MTH 346 Linear Diophantine Quick Challenge

You have 10-15 minutes to solve as best you can with your group. Be ready to present to the class.

1. I have an unlimited supply of 5-cent and 7-cent stamps. What is the largest amount of postage that I *cannot* make with my stamps. Prove I can make all other amounts.
2. Explain how to find a solution to the Diophantine equation $6X + 10Y + 45Z = 1$ using the methods from class. First express $\gcd(6, 10)$ as a linear combination of 6 and 10. Then express 1 as a linear combination of 45 and $\gcd(6, 10)$. Explain how this works in general to solve $aX + bY + cZ = d$.

Solve this one by Monday for 5 points extra credit

3. Let $a, b, c \in \mathbb{N}$ such that $\gcd(a, b) = 1$ and $c > ab$. Prove that $aX + bY = c$ has a solution in which X and Y are both positive integers.