PROBLEM SET 3 (due on Friday, April 20th)

A. Find all solutions $x \in \mathbf{Z}$ to the congruence $5x \equiv 7 \pmod{11}$.

B. A certain integer a gives a remainder of 1 when divided by 12. What can you say about the remainder that a gives when divided by 4?

C. A certain integer a gives a remainder of 1 when divided by 4. What can you say about the remainder that a gives when divided by 12?

D. A certain integer b satisfies the congruence $b \equiv -3 \pmod{19}$. What can you say about the remainder that b gives when divided by 19? What can you say about the remainder that b gives when divided by 95?

E. A certain integer c gives a remainder of 5 when divided by 15. What can you say about the remainder that c gives when divided by 91?

F. Suppose that $a,\ b \in \mathbf{Z}$ and that $a^2 - 18b^2 = 34$. Prove that $17 \nmid a$.

G. Let $n = 289^{15}5^{21}10^{19}2^{43}$. Find the remainder that n gives when divided by 9.