

Use gp to solve the following. Use the commands: bezout( $a, b$ ), Mod( $a, n$ ) and factor( $n$ ). You probably want to copy and paste the numbers into gp otherwise you will almost certainly make a mistake in typing the numbers. Since it is sometimes hard to copy and paste from a pdf file, I have included a link: "<http://home.sandiego.edu/~cparker/math370/numbers.html>" to an html file with the numbers. It might also be easier to use the assignment statement in gp, that is type " $a = 15$ " to store  $a$  as 15.

1. Find all incongruent solutions to:

$$ax \equiv b \pmod{m}$$

where:

$$a = 1254851451547852$$

$$b = 123441422$$

$$m = 158745852141451118514.$$

2. Let  $n = 143463297936326060937067935856984812402586546758449448908554164755013977393$ .
  - (a) Try to factor  $n$ . Let it go for a few minutes.
  - (b) Try to figure out if it is prime using Fermat's Little Theorem.