

Some notes on the homework assignment:

- Remember to acknowledge your collaborators and cite your sources. The template has a section built in for you to do this (see the comments in the template).
- Remember to let me know if you can't do your peer review this week (for any reason)!
- You are not required to use Overleaf. If you have L<sup>A</sup>T<sub>E</sub>X installed on a personal computer, I recommend using that.

Here's the schedule of when things are due for this assignment.

Component Due	Date
Draft of Solutions	Thursday, January 20
Peer Review	Tuesday, January 25
Final Copy	Friday, January 28

And finally, here are the problem statements.

1. Let  $F_n$  denote the  $n$ th Fibonacci number. Show that  $F_n = 5F_{n-4} + 3F_{n-5}$  whenever  $n > 5$ . Use this result to show that  $F_n$  is divisible by 5 whenever  $n$  is divisible by 5.
2. We say that  $a$  is relatively prime to  $b$  if  $(a, b) = 1$ .
  - (a) Find all positive integers less than 10 that are relatively prime to 10.
  - (b) Find all positive integers less than 11 that are relatively prime to 11.
3. Are there integers  $a, b$ , and  $c$  so that  $a \mid bc$  but  $a \nmid b$  and  $a \nmid c$ ?
4.
  - (a) Show that if  $a \in \mathbb{Z}$ , then  $3 \mid a^3 - a$
  - (b) Show that if  $a \in \mathbb{Z}$ , then  $5 \mid a^5 - a$