Lior Silberman’s Math 312: ComPAIR Assignment 1

- This assignment is due Wednesday, 20/1/2021 at noon (Vancouver time)
- Comparisons are due Sunday, 24/1/2021 at 11pm (Vancouver time).

1. You have an infinite supply of $2 and $3 coins. Use the well-ordering principle to prove that any sum of at least $2 can be paid using these coins.

2. Let $f(n) = 7^7 - n$. Show by induction that $f(n)$ is divisible by 7 for all $n$.

3. For any integer $x$:
   (a) Show that $(x^4 + x^3 + x^2 + x + 1, x - 1)$ is either 1 or 5.
   (b) Give a concise criterion in terms of $x$ for when the answer is 5.
   (c) Repeat for $(x^5 + x^4 + x^3 + x^2 + x + 1, x - 1)$.