EXCEL 21-127
18 February 2020

0. Exam reflection. https://tinyurl.com/exam-reflect [5 mins]

1. Some more practice on sets. [10 mins]
   a. Prove $(A \cup B)^C = A^C \cap B^C$
   b. Prove $A \times (B \cup C) = (A \times B) \cup (A \times C)$

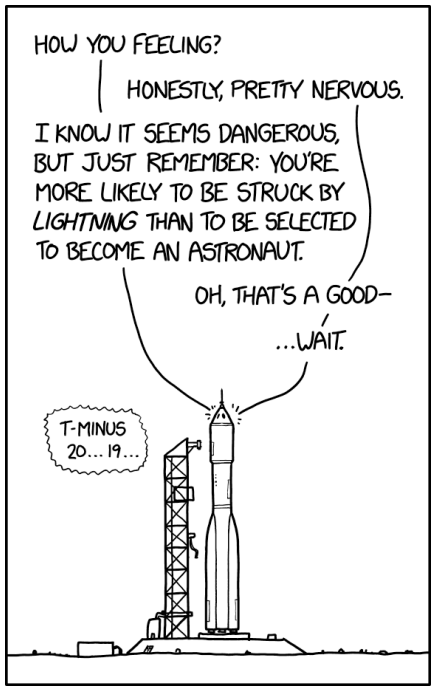
2. Some induction problems. [20 mins]
   a. Prove $\sum_{r=1}^{n} r(r+1)(r+2) = \frac{1}{4}n(n+1)(n+2)(n+3)$ for $n \in \mathbb{N}^+$
   b. Recall Fibonacci numbers $F_1 = F_2 = 1$, $F_{n+2} = F_{n+1} + F_n$ for $n \in \mathbb{N}^+$. Prove $F_n \leq \left(\frac{7}{4}\right)^{n-1}$ for $n \geq 1$
   c. Let $A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$. Find A^n for $n \in \mathbb{N}^+$

3. * The graceful tree problem.

4. * Thue-Morse sequence's second-term self-similarity.

5. * Calculate some continued fractions?

xkcd/alpha_centauri



xkcd/launch_risk