

MAU22C00: TUTORIAL 17 PROBLEMS
COUNTABILITY OF SETS

For each of the following sets, determine whether it is finite, countably infinite, or uncountably infinite. Justify your answer.

- 1) The set of integers divisible by 7.
- 2) $\{11^p \mid p \in \mathbb{Z}\}$
- 3) $\left\{ \left(\frac{m}{3}, \frac{n}{5} \right) \in \mathbb{R}^2 \mid m, n \in \mathbb{Z} \right\}$
- 4) $\{x \in \mathbb{C} \mid x^4 - 2x - 1 = 0\}$
- 5) $\{(x, y) \in \mathbb{R}^2 \mid y = x^6\} \cap \mathbb{Z}^2$
- 6) $\{x \in \mathbb{R} \mid \sin x = 1\}$
- 7) $\bigcup_{q \in \mathbb{Q}} L_q$ where $L_q = \{(x, y) \in \mathbb{R}^2 \mid x = q\} \cap (\mathbb{Q} \times \mathbb{N})$.