Chapter 1.6 Practice

Use the pumping lemma to prove the languages below are not regular.

1. $L = \{a^i b^{3i} \mid i \geq 1\}$

2. $L = \{a^j b^k a^{jk} \mid j \geq 1, k \geq 1\}$

3. $L = \{a^{k^3}\}$

Is the following language regular? Can you use the pumping lemma to prove that it is?

4. $L = \{a^2 b^m a^n b^3 \mid m \geq 0, n \geq 0\}$