Show whether each of the following languages is regular or not by either drawing a DFA or by applying the pumping lemma for regular sets. For all problems let $\Sigma = \{a, b\}$.

1. $\{a^{3i} \mid i \geq 0 \}$

2. $\{a^i b^j a^i \mid i, j \geq 0 \}$

3. $\{a^i b^j \mid 0 \leq i < 3 < j \}$

4. $\{a^i b^j \mid i, j > 0 \text{ and either } i \text{ or } j \text{ is odd, but not both} \}$

5. $\{a^i b^j \mid 0 \leq j < i \}$

6. $\{x \mid x \text{ has an equal number of } a's \text{ and } b's \}$

7. $\{x \mid x \text{ has an equal number of } ab \text{ and } ba \text{ substrings} \}$

8. $\{xwx^R \mid x \in (a+b)^*, w \in (a+b), x^R \text{ is the reverse of } x \}$

9. $\{xwx^R \mid x, w \in (a+b)^*, x^R \text{ is the reverse of } x \}$

10. $\{a^i \mid i \text{ is prime} \}$