HW 1.1: Sequences

List the first 5 terms of the sequence
1. \( a_n = \cos(n\pi/2) \)
2. \( b_n = \frac{2^n}{(n+1)!} \)

Find a formula for \( a_n \)
3. \( \{a_n\} = \{4, 7, 10, 13, 16, \ldots \} \)
4. \( \{a_n\} = \left[ \frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \ldots \right] \)

Find \( \lim_{n \to \infty} a_n \) or show why the limit does not exist
5. \( a_n = \frac{\cos(n)}{n} \)
6. \( a_n = e^{1/n} \)
7. \( a_n = \{1, \frac{1}{2}, 1, \frac{1}{3}, 1, \frac{1}{4}, 1, \frac{1}{5}, 1, \frac{1}{6}, \ldots \} \)
8. \( a_n = \frac{(\ln n)^2}{n} \)
9. \( a_n = \frac{\sqrt{4n^6 - 3n^5 + 5n^2 - 1}}{6n^3 + n^2 - 3n + 4} \)

10. [*] a farmer starts with 5000 fish in his pond. Each month, the population grows by 8%, then he harvests 300
    (a) what is \( a_0 \)?
    (b) what is \( a_5 \)?
    (c) find an expression for \( a_n \)