1. Find the exact value of the convergent series \( \sum_{n=1}^{\infty} \frac{4^{n+1}}{7^n} \).
2. Use any valid convergence/divergence test (and explain why the hypotheses are justified!) to determine whether or not \( \sum_{n=2}^{\infty} (-1)^n \frac{n^2}{n^3 - 1} \) is (a) convergent
(b) absolutely convergent
3. Test the following series for convergence or divergence. Clearly state what series convergence/divergence test you apply and explain why the hypotheses are justified.

(a) \[ \sum_{n=1}^{\infty} (-1)^n 2^{\frac{1}{n}} \]
(b) \[ \sum_{n=1}^{\infty} \frac{(2n + 1)^n}{n^{2n}} \]
(c) \[ \sum_{n=1}^{\infty} \frac{1}{n^2 - \ln n} \]
4. State whether the following statements are true or false. You do not need to show any work.

(a) ______ If $0 \leq a_n \leq b_n$ and $\sum b_n$ diverges, then $\sum a_n$ must diverge.

(b) ______ If $\sum_{n=1}^{\infty} a_n = 3$, then $\lim_{n \to \infty} a_n$ must be 0.

(c) ______ If $\sum_{n=144}^{\infty} a_n$ converges, then $\sum_{n=1}^{\infty} a_n$ must converge.

(d) ______ One way to prove that a series is convergent is to prove that it is absolutely convergent.