5. [12 points] Determine whether each of the following series converges, conditionally converges, or diverges. Fully justify your answer. Include any convergence tests used.

a. [6 points] \( \sum_{n=1}^{\infty} ne^{-2n} \)

Circle one: Absolutely convergent  Conditionally convergent  Divergent

Justification:

b. [6 points] \( \sum_{n=1}^{\infty} (-1)^n \frac{\sqrt{n} + 2}{\sqrt{n^3} + 1} \)

Circle one: Absolutely convergent  Conditionally convergent  Divergent

Justification: