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] $\displaystyle\sum_{n=1}^{\infty} ne^{-2n}$

Circle one: **Absolutely convergent** **Conditionally convergent** **Divergent**

Justification:

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

Circle one: **Absolutely convergent** **Conditionally convergent** **Divergent**

Justification: