3. [12 points]
   a. [6 points] State whether each of the following series converges or diverges. Indicate which test you use to decide. Show all of your work to receive full credit.
   
   1. \( \sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}} \)

   2. \( \sum_{n=1}^{\infty} \frac{\cos^2(n)}{\sqrt{n^3}} \)

   b. [6 points] Decide whether each of the following series converges absolutely, converges conditionally or diverges. Circle your answer. No justification required.

   1. \( \sum_{n=0}^{\infty} \frac{(-1)^n \sqrt{n^2 + 1}}{n^2 + n + 8} \)
   Converges absolutely Converges conditionally Diverges

   2. \( \sum_{n=0}^{\infty} \frac{(-2)^{3n}}{5^n} \)
   Converges absolutely Converges conditionally Diverges