9. [15 points] Suppose that we know that \( \sum_{n=1}^{\infty} a_n \) converges—but we don’t know what \( a_n \) is. For each of the series below, determine whether it converges, diverges, or we cannot tell (that is, there could be one value for \( a_n \) that would converge and one that would not). Circle your answer and provide a short but careful explanation for your answer (how do we know the series converges or diverges?, or, what examples show that we cannot tell?).

(a) [3 points out of 15] \( \sum_{n=1}^{\infty} |a_n| \)    
converges    diverges    cannot tell

(b) [3 points out of 15] \( \sum_{n=1}^{\infty} (-1)^n |a_n| \)    
converges    diverges    cannot tell

(c) [3 points out of 15] \( \sum_{n=1}^{\infty} \frac{a_n+1}{a_n+5} \)    
converges    diverges    cannot tell

(d) [3 points out of 15] \( \sum_{n=1}^{\infty} \frac{a_n}{n^2} \)    
converges    diverges    cannot tell

(e) [3 points out of 15] \( \sum_{n=1}^{\infty} \frac{3^n a_n}{n} \)    
converges    diverges    cannot tell