Do the following converge or diverge?

1. $\displaystyle\sum_{k=1}^{\infty} \frac{2k+2}{5k+17}$

2. $\displaystyle\sum_{k=4}^{\infty} \frac{\sin(k^5+1)^2}{2^k}$

3. $\displaystyle\sum_{k=13}^{\infty} \frac{1}{k^2+1}$

4. $\displaystyle\sum_{k=42}^{\infty} \frac{3^k+\sin(k)}{\cos(k)+5}$

5. $\displaystyle\sum_{k=3}^{\infty} \frac{1}{k\,\ln(k)}$

6. $\displaystyle\int_1^{\infty} \frac{e^x}{3^{x+1}}\,dx$