Determine whether each series converges or diverges. If it converges, state the sum if possible. Explain.

1. $\displaystyle\sum_{k=0}^{\infty} \frac{2k}{(k^2+3)^9}$

2. $\displaystyle\sum_{k=1}^{\infty} \sqrt{\frac{k}{k+9}}$

Determine whether each series converges or diverges. If it converges, state the sum if possible. Explain.

1. $\displaystyle\sum_{k=1}^{\infty} \frac{10}{k^2 + 9}$

2. $\displaystyle\sum_{k=0}^{\infty} \frac{2^k + 3^k}{4^k}$