

Do the following series converge or diverge?

1.
$$\sum_{k=98}^{\infty} \frac{3^k + \sin(k)}{\cos(k) + 5}$$

2.
$$\sum_{k=1}^{\infty} \frac{2k^2 - 3}{5k^2 + 6k}$$

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

Hint: Draw a picture comparing with $\int_1^{\infty} \frac{1}{x^2} dx$.

4.
$$\sum_{k=1}^{\infty} \frac{1}{k}$$

Hint: Draw a picture comparing with $\int_1^{\infty} \frac{1}{x} dx$.