

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

4.
$$\sum_{k=2}^{\infty} \frac{1}{k^2}$$

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

5.
$$\sum_{k=1}^{\infty} \frac{1}{k}$$

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