Do the following series converge or diverge?

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

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

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

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

Goals: Be able to :

1. determine whether a series $\sum a_k$ converges or diverges.
2. If it converges, find the limit (that is, the value of the series) exactly, if possible.
3. If it converges but we can't find the limit exactly, be able to approximate it.