A.1-1 Find a simple formula for the sum of the first $n$ odd numbers:

$$
\sum_{k=1}^{n} (2k - 1)
$$

A.2-1 Show that $\sum_{k=1}^{n} 1/k^2$ is bounded above by a constant.

A.2-2 Find an asymptotic upper bound on the summation

$$
\sum_{k=0}^{\lfloor \log n \rfloor} \left\lceil \frac{n}{2^k} \right\rceil.
$$

A.1b Give asymptotically tight bounds on the following summations. Assume that $s \geq 0$ is a constant.

$$
\sum_{k=1}^{n} \log^s k.
$$