Assignment RA. Hints

(1) Suppose $b_n \to 0$. We can find N such that $|b_n| <$ small for $n \geq K$.
Split $b_1 + \dots + b_n$ as $b_1 + \dots + b_{K-1} + b_K + \dots + b_n$
Then use triangle inequality on

$$\left| \frac{b_1 + \dots + b_n}{n} - 0 \right|$$

$\left| \frac{b_K + \dots + b_n}{n} \right|$ can be made as small as we like.

(2) Use partial fractions. Add and subtract $\frac{1}{4n+2}$, then group terms. Write out as many terms as needed. Compare to $\ln 2$. You will have to add and subtract terms

(3) $\{x_{n_k}\}$ is a convergent subsequence of the sequence $a < x_n < a + 1/n$.
Recall definition of continuity. Let $f(x_{n_k}) \to A$

$|f(a) - A| = |f(a) - f(x_{n_k}) + f(x_{n_k}) - A|$

(4) (i) Is inverse function theorem
(ii) Use Taylor series for e^x

(5) Expand $f(a+2h)$ etc as Taylor series

(6) This requires a theorem from lectures explaining when $\int f_n \to \int f$.