

10. Let

$$a_n = \left(1 + \frac{2}{n}\right)^n, \quad n = 1, 2,$$

Find the least upper bound for the sequence $\{a_n\}$. Be sure to explain why the number you claim to be the least upper bound is, in fact, the least upper bound.

Solution: First, $a_n \rightarrow e^2$. (proof?)

Second $\{a_n\}$ is an increasing sequence. {proof?}

Finally, a bounded, increasing sequence converges to the least upper bound of the sequence, so the least upper bound in this case is e^2 .