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COS 488 Week 3: Q1

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To compare α and β raised to powers, we look at their ratio and show that it is exponentially small:

$$\alpha^N/\beta^N = (\frac{\alpha}{\beta})^N = e^{-N(ln(\alpha/\beta))} = e^{-cN}$$

(where c is just a constant) which is functionally identical to $e^{-N'}$, since for any value of N', there exists a value of N such that cN ¿ N' (by the archimedian property). Thus since we know that $e^{-N'}$ is exponentially small, so must be α^N/β^N.
When N = 10, the absolute error (just alpha to the N) is 2.594, exact value is 8.79, giving a .30 relative error.
When N = 100 the absolute error is (about, modula decimals) 13780, exact value is (about) 82831755, giving a .0002 relative error.
(Worked with Maryam B., brief consultation with Matt T.)