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1. Using the function $e^{f(z)}$ show that the maximum principle holds also for the real part of an analytic function f, and, of course, for the imaginary part as well: none of these two functions can have a local maximum. Show that they cannot have a local minimum either.

2. Find the maximum and the minimum (and where these values are taken) for $\operatorname{Re} f$ where $f(z) = e^z$ in the region

$$[0, 1] \times [0, \pi].$$

3. If f is analytic at z and $f(z) \neq 0$ show that there is $r > 0$ such that the value $|f(z)|$ is not the minimum value of $|f(w)|$ for $|w - z| \leq r$. *Hint:* Consider $g(z) = 1/f(z)$.

4. Find the maximum and the minimum absolute value of the function $f(z) = (z - 2i)^3$ for $|z| \leq 1$.