QUESTION
According to David Wells (*The Penguin dictionary of curious and interesting numbers*)

$$4^4 + 3^3 + 8^8 + 5^5 + 7^7 + 9^9 + 0^0 + 8^8 + 8^8 = 438,579,088.$$

Do you agree?

ANSWER
Many students will, no doubt, do the same as I did when I first saw this problem: type the left hand side of the equation into their calculator without thinking, so getting an error message!

The alledged result is true only if one adopts the convention that $0^0 = 0$. But the function $z = x^y$ has an essential singularity at $(x, y) = (0, 0)$ so it is not possible to assign a reasonable value to 0^0. One might adopt the convention that $0^0 = \lim_{x \to 0+} x^x$ but this gives 1 not 0.

The question is designed to get students to think for themselves.