

Problem 7: A System of Equations

Consider the real numbers x, y that satisfy the equations

$$x + y = x^3 + y^3 = x^5 + y^5$$

What are the possible values of $x + y$? Fully explain your answer and show your steps.

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted. The use of generative AI tools is not allowed.

Posting Date 11/29/2025. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by 11:59 pm, Dec 12, 2025. An email submission must be a single pdf file. Hard copy submissions must be dropped in the file holder at my office door (Hayes 319) and must include a time stamp.