

Problem 4: Rational or Irrational?

Determine whether the real number

$$\sqrt[3]{25 + 5\sqrt{20}} + \sqrt[3]{25 - 5\sqrt{20}}$$

is rational or irrational. 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 10/10/2025. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by noon on Fri, Oct 24, 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.