Factoring Enrichment

Math 10 · Mr. Merrick · October 22, 2025

1. Factor completely over the real numbers: $x^4 + 1$.

2. Factor completely over the real numbers: $x^4 + 4$.
   Note: This is a special case of the Sophie Germain identity, named for Sophie Germain.

3. Factor completely over the real numbers: $x^8 - 1$.

4. Factor completely over the real numbers: $x^6 - 64$.

5. Factor completely over the real numbers: $x^{12} - y^{12}$.

6. Determine whether each polynomial factors over the real numbers. If so, factor completely.
   (a) $x^4 - 5x^2 + 4$ (b) $x^4 + 4x^2 + 4$ (c) $x^4 + 4x^2 + 5$