Prime factor each polynomial. Use the methods that will get the work completed the quickest. These are enchanting!

1. \( x^6 - 1 \)
2. \( 125x^5 - 500x^3 - x^2 + 4 \)

Write the simplest polynomial function with the given zeros.

3. 3, \( \frac{1}{4} \), and \(-2\)
4. 4i and \(-2\)

5. \( i \) and \( 4\sqrt{2} \)
6. 0 and \( 2 - i \)
Using the rational zero theorem, list all the possible roots (solutions) of each equation. DO NOT FIND THE SOLUTIONS.

7. \(2x^4 + 8x^3 - x - 18 = 0\)

Find ALL of the solutions for each equation. In the process, PRIME FACTOR each polynomial. Before you use the Rational Zero Theorem in order to factor, use other methods like finding the GCF, difference of squares, difference of cubes, sums of cubes, reverse foil with trinomials, and grouping. When applicable, express your answer in SIMPLIFIED RADICAL FORM. HAVE FUN!

8. \(x^4 + 14x^2 + 45 = 0\)
9. \(x^3 - 4x^2 + x + 14 = 8\)

10. \(2x^4 + x^3 + 2x^2 + 4x - 24 = 0\)
11. \(-2x^4 + 162 = 0\)
Find the ZEROS of each function. In the process, PRIME FACTOR $f(x)$. If necessary, express your answer in SIMPLIFIED RADICAL FORM.

12. $x^4 - 13x^3 + 55x^2 - 91x = f(x)$
13. $x^4 - 4x^3 + x^2 + 16x - 20 = f(x)$

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14. $3x^3 - 10x^2 + 10x - 4 = f(x)$

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15. The volume of the rectangular prism is 105 cubic units. Find the dimensions of the prism.