

SOLVING HIGHER DEGREE POLYNOMIAL EQUATION—WORKSHEET #1

For each equation below: First determine the set of ALL POSSIBLE RATIONAL SOLUTIONS. Then, use the one or more given factors of the polynomial. You may use long division or synthetic division (where possible) to complete the factorization of this polynomial. Once you have factored the polynomial, solve the given equation including all rational, irrational, and complex number solutions.

(1) $x^3 - 2x^2 - 11x + 12 = 0$
Factor: $x - 1$

(2) $x^3 + x^2 - 4x - 4 = 0$
Factor: $x + 2$

(3) $15x^3 + 14x^2 - 3x - 2 = 0$
Factor: $x + 1$

(4) $3x^3 + 13x^2 - 52x + 28 = 0$
Factor: $x + 7$

(5) $8x^3 - 2x^2 - 41x - 10 = 0$
Factor: $x + 2$

(6) $6x^3 + x^2 - 10x + 3 = 0$
Factor: $x - 1$

(7) $x^3 - x^2 - 8x + 12 = 0$
Factor: $x + 3$

(8) $x^3 - 2x^2 - 7x - 4 = 0$
Factor: $x + 1$

(9) $x^3 - 4x^2 + 8 = 0$
Factor: $x - 2$

(10) $x^3 - 10x - 12 = 0$
Factor: $x + 2$

(11) $x^4 + 4x^3 - x^2 - 16x - 12 = 0$
Factor: $x^2 - 4$

(12) $x^4 - 4x^3 - 7x^2 + 34x - 24 = 0$
Factors: $x + 3$; $x - 1$

(13) $x^4 + x^3 - 3x^2 - 17x - 30 = 0$
Factors: $x + 2$; $x - 3$

(14) $x^4 - 3x^3 + 2x^2 + 2x - 4 = 0$
Factor: $x + 1$; $x - 2$

(15) $x^3 - x^2 + x - 1 = 0$
Factor: $x - 1$

(16) $6x^4 - 13x^3 - 19x^2 + 12x = 0$
Factor: $x - 3$