

WORKSHEET #14—Solving Higher Degree Polynomial Equations

Use the equations in Problem Set 9.3. Below, you will be given one or more factors of the polynomial represented by the left side of each equation in this section. 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) Factor: $x - 1$

(2) Factor: $x + 2$

(3) Factor: $x + 1$

(4) Factor: $x + 7$

(5) Factor: $x + 2$

(6) Factor: $x - 1$

(7) Factor: $x + 3$

(8) Factor: $x + 1$

(9) Factor: $x - 2$

(10) Factor: $x + 2$

(11) Factor: $x^2 - 4$

(12) Factors: $x + 3$; $x - 1$

(13) Factors: $x + 2$; $x - 3$

(14) Factor: $x + 1$; $x - 2$

(15) Factor: $x - 1$

(16) Factor: $x - 3$

(17) Factor: $x^2 - 3$

(18) Factor: $x^2 - 2$

(19) Factor: $x^2 + 4x + 4$

(20) Factors: $x + 1$; $x^2 + 1$

Answers:

- (1) $\{-3, 1, 4\}$
- (2) $\{-2, -1, 2\}$
- (3) $\{-1, -\frac{1}{3}, \frac{2}{5}\}$
- (4) $\{-7, \frac{2}{3}, 2\}$
- (5) $\{-2, -\frac{1}{4}, \frac{5}{2}\}$
- (6) $\{-\frac{3}{2}, \frac{1}{3}, 1\}$
- (7) $\{-3, 2\}$
- (8) $\{-1, 4\}$
- (9) $\{2, 1 \pm \sqrt{5}\}$
- (10) $\{-2, 1 \pm \sqrt{7}\}$
- (11) $\{-3, -2, -1, 2\}$
- (12) $\{-3, 1, 2, 4\}$
- (13) $\{-2, 3, -1 \pm 2i\}$
- (14) $\{-1, 2, 1 \pm i\}$
- (15) $\{1, \pm i\}$
- (16) $\{-\frac{4}{3}, 0, \frac{1}{2}, 3\}$
- (17) $\{-\frac{5}{2}, 1, \pm\sqrt{3}\}$
- (18) $\{-\frac{2}{3}, 1, \pm\sqrt{2}\}$
- (19) $\{-2, \frac{1}{2}\}$
- (20) $\{-1, \frac{3}{2}, 2, \pm i\}$