

**Solving Polynomial Equations By Factoring**

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**Find all solutions of the equations.**

1)  $(x^2 - 6)(x^2 + 1) = 0$

2)  $(x - 2)(x + 2)(x^2 + 2) = 0$

3)  $x(x + 2)(x^2 - 5) = 0$

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

**Find all solutions. FACTOR FIRST! Look for a GCF.**

5)  $x^3 - 2x^2 - 3x = 0$

6)  $x^3 + 5x^2 + 6x = 0$

7)  $x^3 + 5x^2 + 4x = 0$

8)  $x^3 - 4x = 0$

**Find all solutions. Factor by GROUPING.**

9)  $x^4 - 2x^3 + 3x^2 - 6x = 0$

10)  $x^5 - x^4 - 2x^3 + 2x^2 = 0$

11)  $x^4 - 3x^3 - 5x^2 + 15x = 0$

**Find all solutions. Factor sum/difference of 2 cubes.**

12)  $x^3 + 64 = 0$

13)  $x^3 - 125 = 0$

14)  $x^3 - 27 = 0$

**Find all solutions. Factor first!**

15)  $x^4 - 10x^2 + 21 = 0$

16)  $x^4 - 3x^2 - 4 = 0$

17)  $x^4 + 2x^2 - 35 = 0$

## Answers to Solving Polynomial Equations By Factoring (ID: 1)

- 1)  $\{\sqrt{6}, -\sqrt{6}, i, -i\}$       2)  $\{2, -2, i\sqrt{2}, -i\sqrt{2}\}$       3)  $\{0, -2, \sqrt{5}, -\sqrt{5}\}$   
 4)  $\{i\sqrt{3}, -i\sqrt{3}, \sqrt{2}, -\sqrt{2}\}$       5)  $\{0, 3, -1\}$       6)  $\{0, -2, -3\}$   
 7)  $\{0, -1, -4\}$       8)  $\{0, 2, -2\}$       9)  $\{0, 2, i\sqrt{3}, -i\sqrt{3}\}$   
 10)  $\{0 \text{ mult. } 2, 1, \sqrt{2}, -\sqrt{2}\}$       11)  $\{0, 3, \sqrt{5}, -\sqrt{5}\}$       12)  $\{-4, 2 + 2i\sqrt{3}, 2 - 2i\sqrt{3}\}$   
 13)  $\left\{5, \frac{-5 + 5i\sqrt{3}}{2}, \frac{-5 - 5i\sqrt{3}}{2}\right\}$       14)  $\left\{3, \frac{-3 + 3i\sqrt{3}}{2}, \frac{-3 - 3i\sqrt{3}}{2}\right\}$       15)  $\{\sqrt{3}, -\sqrt{3}, \sqrt{7}, -\sqrt{7}\}$   
 16)  $\{i, -i, 2, -2\}$       17)  $\{\sqrt{5}, -\sqrt{5}, i\sqrt{7}, -i\sqrt{7}\}$