

# Solving Cubic Equations

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**Find all roots.**

1)  $2x^3 + 3x^2 + 8x + 12 = 0$

2)  $2x^3 - x^2 + 2x - 1 = 0$

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

4)  $x^3 - 125 = 0$

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

6)  $-27x^3 + 8 = 0$

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

8)  $4x^3 - 3x^2 + 20x - 15 = 0$

9)  $x^3 - 27 = 0$

10)  $4x^3 + 3x^2 + 8x + 6 = 0$

11)  $4x^3 + x^2 - 8x - 2 = 0$

12)  $27x^3 + 64 = 0$

13)  $x^3 - 1 = 0$

14)  $5x^3 - 2x^2 + 5x - 2 = 0$

15)  $5x^3 + 15x^2 + 4x + 12 = 0$

16)  $x^3 - 64 = 0$

17)  $x^3 + 8 = 0$

18)  $x^3 - 8 = 0$

19)  $3x^3 - 2x^2 - 6x + 4 = 0$

20)  $4x^3 + x^2 - 4x - 1 = 0$

## Answers to Solving Cubic Equations

- 1)  $\left\{-\frac{3}{2}, 2i, -2i\right\}$       3)  $\left\{2, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}\right\}$       5)  $\left\{-\frac{5}{3}, -1, 1\right\}$       7)  $\left\{-\frac{2}{3}, -2, 2\right\}$
- 9)  $\left\{3, \frac{-3+3i\sqrt{3}}{2}, \frac{-3-3i\sqrt{3}}{2}\right\}$       11)  $\left\{-\frac{1}{4}, \sqrt{2}, -\sqrt{2}\right\}$       13)  $\left\{1, \frac{-1+i\sqrt{3}}{2}, \frac{-1-i\sqrt{3}}{2}\right\}$
- 15)  $\left\{-3, \frac{2i\sqrt{5}}{5}, -\frac{2i\sqrt{5}}{5}\right\}$       17)  $\{-2, 1+i\sqrt{3}, 1-i\sqrt{3}\}$       19)  $\left\{\frac{2}{3}, \sqrt{2}, -\sqrt{2}\right\}$