

# Solving Polynomial Equations - Key

$$\begin{aligned} \textcircled{1} \quad z^2 + 2z - 15 &= 0 \\ (z+5)(z-3) &= 0 \\ z &= -5, 3 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad a^2 + 3a &= -2 \\ a^2 + 3a + 2 &= 0 \\ (a+2)(a+1) &= 0 \\ a &= -2, -1 \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad b^2 &= 12(b-3) \\ b^2 &= 12b - 36 \\ b^2 - 12b + 36 &= 0 \\ (b-6)(b-6) &= 0 \\ b &= 6 \text{ Dbl. Rt.} \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad y(y-1) &= 6y \\ y^2 - y &= 6y \\ y^2 - 7y &= 0 \\ y(y-7) &= 0 \\ y &= 0, 7 \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad r^2 + 2 &= 11 \\ \sqrt{r^2} &= \sqrt{9} \\ r &= \pm 3 \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad 7u + 10 &= -u^2 \\ u^2 + 7u + 10 &= 0 \\ (u+5)(u+2) &= 0 \\ u &= -5, -2 \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad 3x^2 + 6x + 3 &= 0 \\ 3(x^2 + 2x + 1) &= 0 \\ 3(x+1)^2 &= 0 \\ x &= -1 \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad s^2 - 3 &= -2s \\ s^2 + 2s - 3 &= 0 \\ (s+3)(s-1) &= 0 \\ s &= -3, 1 \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad 6(1+c) &= c - c^2 \\ 6 + 6c &= c - c^2 \\ c^2 + 5c + 6 &= 0 \\ (c+3)(c+2) &= 0 \\ c &= -3, -2 \end{aligned}$$

$$\begin{aligned} \textcircled{10} \quad v(v-2) &= 15 \\ v^2 - 2v - 15 &= 0 \\ (v-5)(v+3) &= 0 \\ v &= 5, v = -3 \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad 3h^2 - 4h + 1 &= 0 \\ (3h-1)(h-1) &= 0 \\ h &= \frac{1}{3}, h = 1 \end{aligned}$$

$$\begin{aligned} \textcircled{12} \quad 5d^2 &= 2d \\ 5d^2 - 2d &= 0 \\ d(5d-2) &= 0 \\ d &= 0, d = \frac{2}{5} \end{aligned}$$

$$\begin{aligned} \textcircled{13} \quad 10t^2 - 3t - 1 &= 0 \\ (5t+1)(2t-1) &= 0 \\ t &= -\frac{1}{5}, t = \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{14} \quad 12m^2 + 7m + 1 &= 0 \\ (3m+1)(4m+1) &= 0 \\ m &= -\frac{1}{3}, m = -\frac{1}{4} \end{aligned}$$

$$\begin{aligned} \textcircled{15} \quad 3e(3e-1) &= 2 \\ 9e^2 - 3e - 2 &= 0 \\ (3e-2)(3e+1) &= 0 \\ e &= \frac{2}{3}, e = -\frac{1}{3} \end{aligned}$$

$$\begin{aligned} \textcircled{16} \quad 20k^2 + 5 &= 29k \\ 20k^2 - 29k + 5 &= 0 \\ (5k-1)(4k-5) &= 0 \\ k &= \frac{1}{5}, k = \frac{5}{4} \end{aligned}$$

$$\begin{aligned} \textcircled{17} \quad 9(w^2+1) &= 9-w \\ 9w^2 + 9 &= 9-w \\ 9w^2 + w &= 0 \\ w(9w+1) &= 0 \\ w &= 0, w = -\frac{1}{9} \end{aligned}$$

$$\begin{aligned} \textcircled{18} \quad 25n^2 &= 10n - 1 \\ 25n^2 - 10n + 1 &= 0 \\ (5n-1)(5n-1) &= 0 \\ n &= \frac{1}{5} \text{ Dbl Root} \end{aligned}$$

$$\begin{aligned} \textcircled{19} \quad 10a^2 &= 3(7a-3) \\ 10a^2 &= 21a - 9 \\ 10a^2 - 21a + 9 &= 0 \\ (5a-3)(2a-3) &= 0 \\ a &= \frac{3}{5}, a = \frac{3}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{20} \quad 6(z^2+1) &= -13z \\ 6z^2 + 6 &= -13z \\ 6z^2 + 13z + 6 &= 0 \\ (3z+2)(2z+3) &= 0 \\ z &= -\frac{2}{3}, z = -\frac{3}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{21} \quad (x+1)^2 &= 2x+1 \\ x^2 + 2x + 1 &= 2x+1 \\ x^2 &= 0 \\ x &= 0 \text{ Dbl Root} \end{aligned}$$

$$\begin{aligned} \textcircled{22} \quad 5b^2 - 12 &= 17b \\ 5b^2 - 17b - 12 &= 0 \\ (5b+3)(b-4) &= 0 \\ b &= -\frac{3}{5}, b = 4 \end{aligned}$$

$$\begin{aligned} \textcircled{23} \quad 10m(m+2) + 2(m+1) &= m \\ 10m^2 + 20m + 2m + 2 - m &= 0 \\ 10m^2 + 21m + 2 &= 0 \\ (10m+1)(m+2) &= 0 \\ m &= -\frac{1}{10}, m = -2 \end{aligned}$$

$$\begin{aligned} \textcircled{24} \quad 24r &= 5(r^2-1) \\ 24r &= 5r^2 - 5 \\ 0 &= 5r^2 - 24r - 5 \\ 0 &= (5r+1)(r-5) \\ r &= -\frac{1}{5}, r = 5 \end{aligned}$$

$$\begin{aligned} \textcircled{25} \quad 8s^2 - 13s &= -\frac{3}{2} \\ 2(8s^2 - 13s + \frac{3}{2}) &= 0 \cdot 2 \\ 16s^2 - 26s + 3 &= 0 \\ (8s-2)(2s-3) &= 0 \\ s &= \frac{2}{8}, s = \frac{3}{2} \\ s &= \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \textcircled{26} \quad 8(c^3-c) &= c(6c+1) \\ 8c^3 - 8c &= 6c^2 + c \\ 8c^3 - 6c^2 - 9c &= 0 \\ c(8c^2 - 6c - 9) &= 0 \\ c(4c+3)(2c-3) &= 0 \\ c &= 0, c = -\frac{3}{4}, c = \frac{3}{2} \end{aligned}$$

$$\textcircled{27} \begin{aligned} (x-1)(x^2-x-6) &= 0 \\ (x-1)(x-3)(x+2) &= 0 \\ x=0 \quad x=3 \quad x=-2 \end{aligned}$$

$$\textcircled{28} \begin{aligned} (t-2)(6t^2+2t-4) &= 0 \\ (t-2)(3t-2)(2t+2) &= 0 \\ t=2 \quad t=\frac{2}{3} \quad t=-1 \end{aligned}$$