Home > Numerical methods calculators > Bairstow method example

Bairstow method example (Enter your problem)

1. (Method-1). Algorithm Formula : $b_0 = a_0 + rb_1 + sb_2$
(Previous example)

3. (Method-1). Example-2 $f(x) = x^4 - 2x^3 + 6x^2 - 2x + 5$ and $r = -1, s = -1$
$x^4 - 3x^3 + 3x^2 - 3x + 2 = 0$
(Next example)

2. (Method-1). Example-1 $f(x) = x^4 - 3x^3 + 3x^2 - 3x + 2r = 0.1$ and $r = 0.1, s = 0.1s = 0.1$

Algorithm

Example-1
Find all roots of polynomial using Bairstow method
f(x) = x^4-3x^3+3x^2-3x+2 and r = 0.1, s = 0.1

Solution:

Let the initial approximation be and

Here $a_4 = 1b_0 = a_0 + rb_1 + sb_2, a_3 = -3f(x) = x^4 - 2x^3 + 6x^2 - 2x + 5, a_2 = 3r = -1, s = -1, a_1 = -3, a_0 = 2$

Iteration=1

$b_4 = a_4 = 1$

(Enter your problem)

$b_3 = a_3 + rb_4 = -3 + 0.1 \cdot 1 = -2.9$

$b_2 = a_2 + rb_3 + sb_4 = 3 + 0.1 \cdot (-2.9) + 0.1 \cdot 1 = 2.81$

$b_1 = a_1 + rb_2 + sb_3 = -3 + 0.1 \cdot 2.81 + 0.1 \cdot (-2.9) = -3.009$

$b_0 = a_0 + rb_1 + sb_2 = 2 + 0.1 \cdot (-3.009) + 0.1 \cdot 2.81 = 1.9801$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -2.9 + 0.1 \cdot 1 = -2.8$

$c_2 = b_2 + rc_3 + sc_4 = 2.81 + 0.1 \cdot (-2.8) + 0.1 \cdot 1 = 2.63$

$c_1 = b_1 + rc_2 + sc_3 = -3.009 + 0.1 \cdot 2.63 + 0.1 \cdot (-2.8) = -3.026$

The simultaneous equations for Δr and Δs are

$c_2\Delta r + c_3\Delta s = -b_1$ and $c_1\Delta r + c_2\Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$2.63\Delta r - 2.8\Delta s = 3.009$ and $-3.026\Delta r + 2.63\Delta s = -1.9801$

Solving equations using Cramer's rule method
$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 2.63 \cdot 2.63 - (-3.026) \cdot (-2.8) = -1.5559$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = 1.9801 \cdot (-2.8) - (-3.009) \cdot 2.63 = 2.36939$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-3.009) \cdot (-3.026) - 1.9801 \cdot 2.63 = 3.89757$

$\Delta r = \frac{D_1}{D} = \frac{2.36939}{-1.5559} = -1.52284$

and $\Delta s = \frac{D_2}{D} = \frac{3.89757}{-1.5559} = -2.50503$

The new r and s are

$r = r + \Delta r = 0.1 - 1.52284 = -1.42284$

and $s = s + \Delta s = 0.1 - 2.50503 = -2.40503$

The approximate error in r and s

$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\% = \left|\frac{-1.52284}{-1.42284}\right| \times 100\% = 107.02819$

$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\% = \left|\frac{-2.50503}{-2.40503}\right| \times 100\% = 104.15796$

Iteration=2
$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 - 1.42284 \cdot 1 = -4.42284$

$b_2 = a_2 + rb_3 + sb_4 = 3 - 1.42284 \cdot (-4.42284) - 2.40503 \cdot 1 = 6.88798$

$b_1 = a_1 + rb_2 + sb_3 = -3 - 1.42284 \cdot 6.88798 - 2.40503 \cdot (-4.42284) = -2.16345$

$b_0 = a_0 + rb_1 + sb_2 = 2 - 1.42284 \cdot (-2.16345) - 2.40503 \cdot 6.88798 = -11.48752$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -4.42284 - 1.42284 \cdot 1 = -5.84568$

$c_2 = b_2 + rc_3 + sc_4 = 6.88798 - 1.42284 \cdot (-5.84568) - 2.40503 \cdot 1 = 12.80044$

$c_1 = b_1 + rc_2 + sc_3 = -2.16345 - 1.42284 \cdot 12.80044 - 2.40503 \cdot (-5.84568) = -6.31743$

The simultaneous equations for Δr and Δs are

(**Enter your problem**)

$c_2\Delta r + c_3\Delta s = -b_1$ and $c_1\Delta r + c_2\Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$12.80044\Delta r - 5.84568\Delta s = 2.16345$ and $-6.31743\Delta r + 12.80044\Delta s = 11.48752$

Solving equations using Cramer's rule method

$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 12.80044 \cdot 12.80044 - (-6.31743) \cdot (-5.84568) = 126.92152$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-2.16345) \cdot (-6.31743) - (-11.48752) \cdot 12.80044 = 160.71276$

$\Delta r = \frac{D_1}{D} = \frac{94.84557}{126.92152} = 0.74728$

and $\Delta s = \frac{D_2}{D} = \frac{160.71276}{126.92152} = 1.26624$

The new r and s are

$r = r + \Delta r = -1.42284 + 0.74728 = -0.67556$

and $s = s + \Delta s = -2.40503 + 1.26624 = -1.13879$

The approximate error in r and s

$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\% = \left|\frac{0.74728}{-0.67556}\right| \times 100\% = 110.6152$

$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\% = \left|\frac{1.26624}{-1.13879}\right| \times 100\% = 111.19153$

Iteration=3

$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 - 0.67556 \cdot 1 = -3.67556$

$b_2 = a_2 + rb_3 + sb_4 = 3 - 0.67556 \cdot (-3.67556) - 1.13879 \cdot 1 = 4.34429$

$b_1 = a_1 + rb_2 + sb_3 = -3 - 0.67556 \cdot 4.34429 - 1.13879 \cdot (-3.67556) = -1.74916$

$b_0 = a_0 + rb_1 + sb_2 = 2 - 0.67556 \cdot (-1.74916) - 1.13879 \cdot 4.34429 = -1.76557$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -3.67556 - 0.67556 \cdot 1 = -4.35113$

$c_2 = b_2 + rc_3 + sc_4 = 4.34429 - 0.67556 \cdot (-4.35113) - 1.13879 \cdot 1 = 6.14497$

$c_1 = b_1 + rc_2 + sc_3 = -1.74916 - 0.67556 \cdot 6.14497 - 1.13879 \cdot (-4.35113) = -0.94546$

The simultaneous equations for Δr and Δs are

$c_2 \Delta r + c_3 \Delta s = -b_1$ and $c_1 \Delta r + c_2 \Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$6.14497 \Delta r - 4.35113 \Delta s = 1.74916$ and $-0.94546 \Delta r + 6.14497 \Delta s = 1.76557$

Solving equations using Cramer's rule method

$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 6.14497 \cdot 6.14497 - (-0.94546) \cdot (-4.35113) = 33.64686$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = (-1.76557) \cdot (-4.35113) - (-1.74916) \cdot 6.14497 = 18.43073$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-1.74916) \cdot (-0.94546) - (-1.76557) \cdot 6.14497 = 12.50312$

$\Delta r = \frac{D_1}{D} = \frac{18.43073}{33.64686} = 0.54777$

and $\Delta s = \frac{D_2}{D} = \frac{12.50312}{33.64686} = 0.3716$

([Enter your problem])

The new r and s are

$r = r + \Delta r = -0.67556 + 0.54777 = -0.1278$

and $s = s + \Delta s = -1.13879 + 0.3716 = -0.76719$

The approximate error in r and s

$$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{0.3716}{-0.76719}\right| \times 100\,\% = 48.43623$$

Iteration=4

$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 - 0.1278 \cdot 1 = -3.1278$

$b_2 = a_2 + rb_3 + sb_4 = 3 - 0.1278 \cdot (-3.1278) - 0.76719 \cdot 1 = 2.63253$

$b_1 = a_1 + rb_2 + sb_3 = -3 - 0.1278 \cdot 2.63253 - 0.76719 \cdot (-3.1278) = -0.93681$

$b_0 = a_0 + rb_1 + sb_2 = 2 - 0.1278 \cdot (-0.93681) - 0.76719 \cdot 2.63253 = 0.10007$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -3.1278 - 0.1278 \cdot 1 = -3.25559$

$c_2 = b_2 + rc_3 + sc_4 = 2.63253 - 0.1278 \cdot (-3.25559) - 0.76719 \cdot 1 = 2.28138$

$c_1 = b_1 + rc_2 + sc_3 = -0.93681 - 0.1278 \cdot 2.28138 - 0.76719 \cdot (-3.25559) = 1.2693$

The simultaneous equations for Δr and Δs are

$c_2\Delta r + c_3\Delta s = -b_1$ and $c_1\Delta r + c_2\Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$2.28138\Delta r - 3.25559\Delta s = 0.93681$ and $1.2693\Delta r + 2.28138\Delta s = -0.10007$

Solving equations using Cramer's rule method

$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 2.28138 \cdot 2.28138 - 1.2693 \cdot (-3.25559) = 9.33704$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = 0.10007 \cdot (-3.25559) - (-0.93681) \cdot 2.28138 = 1.81143$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-0.93681) \cdot 1.2693 - 0.10007 \cdot 2.28138 = -1.41739$

$$\Delta r = \frac{D_1}{D} = \frac{1.81143}{9.33704} = 0.19401$$

and $\Delta s = \dfrac{D_2}{D} = \dfrac{-1.41739}{9.33704} = -0.1518$

The new r and s are

$r = r + \Delta r = -0.1278 + 0.19401 = 0.06621$

and $s = s + \Delta s = -0.76719 - 0.1518 = -0.91899$

The approximate error in r and s

$$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\,\% = \left|\frac{0.19401}{0.06621}\right| \times 100\,\% = 293.01478$$

$$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{-0.1518}{-0.91899}\right| \times 100\,\% = 16.51837$$

Iteration=5

(**Enter your problem**)

$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 + 0.06621 \cdot 1 = -2.93379$

$b_2 = a_2 + rb_3 + sb_4 = 3 + 0.06621 \cdot (-2.93379) - 0.91899 \cdot 1 = 1.88676$

$b_1 = a_1 + rb_2 + sb_3 = -3 + 0.06621 \cdot 1.88676 - 0.91899 \cdot (-2.93379) = -0.17894$

$b_0 = a_0 + rb_1 + sb_2 = 2 + 0.06621 \cdot (-0.17894) - 0.91899 \cdot 1.88676 = 0.25423$

$b_0 = a_0 + rb_1 + sb_2 = 2 + 0.06621 \cdot (-0.17894) - 0.91899 \cdot 1.88676 = -0.25423$

$c_3 = b_3 + rc_4 = -2.93379 + 0.06621 \cdot 1 = -2.86758$

$c_2 = b_2 + rc_3 + sc_4 = 1.88676 + 0.06621 \cdot (-2.86758) - 0.91899 \cdot 1 = 0.7779$

$c_1 = b_1 + rc_2 + sc_3 = -0.17894 + 0.06621 \cdot 0.7779 - 0.91899 \cdot (-2.86758) = 2.50785$

The simultaneous equations for Δr and Δs are

$c_2 \Delta r + c_3 \Delta s = -b_1$ and $c_1 \Delta r + c_2 \Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$0.7779 \Delta r - 2.86758 \Delta s = 0.17894$ and $2.50785 \Delta r + 0.7779 \Delta s = -0.25423$

Solving equations using Cramer's rule method
$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 0.7779 \cdot 0.7779 - 2.50785 \cdot (-2.86758) = 7.7966$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = 0.25423 \cdot (-2.86758) - (-0.17894) \cdot 0.7779 = -0.58983$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-0.17894) \cdot 2.50785 - 0.25423 \cdot 0.7779 = -0.64653$

$$\Delta r = \frac{D_1}{D} = \frac{-0.58983}{7.7966} = -0.07565$$

and $\Delta s = \dfrac{D_2}{D} = \dfrac{-0.64653}{7.7966} = -0.08292$

The new r and s are

$r = r + \Delta r = 0.06621 - 0.07565 = -0.00944$

and $s = s + \Delta s = -0.91899 - 0.08292 = -1.00192$

The approximate error in r and s

$$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\,\% = \left|\frac{-0.07565}{-0.00944}\right| \times 100\,\% = 801.22073$$

$$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{-0.08292}{-1.00192}\right| \times 100\,\% = 8.27658$$

Iteration=6
$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 - 0.00944 \cdot 1 = -3.00944$

$b_2 = a_2 + rb_3 + sb_4 = 3 - 0.00944 \cdot (-3.00944) - 1.00192 \cdot 1 = 2.0265$

$b_1 = a_1 + rb_2 + sb_3 = -3 - 0.00944 \cdot 2.0265 - 1.00192 \cdot (-3.00944) = -0.00392$

$b_0 = a_0 + rb_1 + sb_2 = 2 - 0.00944 \cdot (-0.00392) - 1.00192 \cdot 2.0265 = -0.03035$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -3.00944 - 0.00944 \cdot 1 = -3.01888$

$c_2 = b_2 + rc_3 + sc_4 = 2.0265 - 0.00944 \cdot (-3.01888) - 1.00192 \cdot 1 = 1.05308$

$c_1 = b_1 + rc_2 + sc_3 = -0.00392 - 0.00944 \cdot 1.05308 - 1.00192 \cdot (-3.01888) = 3.01081$

(Enter your problem)

The simultaneous equations for Δr and Δs are

$c_2 \Delta r + c_3 \Delta s = -b_1$ and $c_1 \Delta r + c_2 \Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$1.05308 \Delta r - 3.01888 \Delta s = 0.00392$ and $3.01081 \Delta r + 1.05308 \Delta s = 0.03035$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-0.00392) \cdot 3.01081 - (-0.03035) \cdot 1.05308 = 0.02016$

$\Delta r = \frac{D_1}{D} = \frac{0.09574}{10.19828} = 0.00939$

and $\Delta s = \frac{D_2}{D} = \frac{0.02016}{10.19828} = 0.00198$

The new r and s are

$r = r + \Delta r = -0.00944 + 0.00939 = -0.00005$

and $s = s + \Delta s = -1.00192 + 0.00198 = -0.99994$

The approximate error in r and s

$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\,\% = \left|\frac{0.00939}{-0.00005}\right| \times 100\,\% = 17406.4444$

$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{0.00198}{-0.99994}\right| \times 100\,\% = 0.19768$

Iteration=7
$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 + 0 \cdot 1 = -3.00005$

$b_2 = a_2 + rb_3 + sb_4 = 3 + 0 \cdot (-3.00005) - 0.99994 \cdot 1 = 2.00022$

$b_1 = a_1 + rb_2 + sb_3 = -3 + 0 \cdot 2.00022 - 0.99994 \cdot (-3.00005) = -0.00023$

$b_0 = a_0 + rb_1 + sb_2 = 2 + 0 \cdot (-0.00023) - 0.99994 \cdot 2.00022 = -0.0001$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -3.00005 + 0 \cdot 1 = -3.00011$

$c_2 = b_2 + rc_3 + sc_4 = 2.00022 + 0 \cdot (-3.00011) - 0.99994 \cdot 1 = 1.00044$

$c_1 = b_1 + rc_2 + sc_3 = -0.00023 + 0 \cdot 1.00044 - 0.99994 \cdot (-3.00011) = 2.99965$

The simultaneous equations for Δr and Δs are

$c_2\Delta r + c_3\Delta s = -b_1$ and $c_1\Delta r + c_2\Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$1.00044\Delta r - 3.00011\Delta s = 0.00023$ and $2.99965\Delta r + 1.00044\Delta s = 0.0001$

Solving equations using Cramer's rule method
$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 1.00044 \cdot 1.00044 - 2.99965 \cdot (-3.00011) = 10.00015$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = (-0.0001) \cdot (-3.00011) - (-0.00023) \cdot 1.00044 = 0.00054$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (-0.00023) \cdot 2.99965 - (-0.0001) \cdot 1.00044 = -0.00058$

$\Delta r = \frac{D_1}{D} = \frac{0.00054}{10.00015} = 0.00005$

and $\Delta s = \frac{D_2}{D} = \frac{-0.00058}{10.00015} = -0.00006$

(Enter your problem)

The new r and s are

$r = r + \Delta r = -0.00005 = 0$

and $s = s + \Delta s = -0.99994 = -1$

The approximate error in r and s

$$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{-0.00006}{-1}\right| \times 100\,\% = 0.00583$$

Iteration=8

$b_4 = a_4 = 1$

$b_3 = a_3 + rb_4 = -3 + 0 \cdot 1 = -3$

$b_2 = a_2 + rb_3 + sb_4 = 3 + 0 \cdot (-3) - 1 \cdot 1 = 2$

$b_1 = a_1 + rb_2 + sb_3 = -3 + 0 \cdot 2 - 1 \cdot (-3) = 0$

$b_0 = a_0 + rb_1 + sb_2 = 2 + 0 \cdot (0) - 1 \cdot 2 = 0$

$c_4 = b_4 = 1$

$c_3 = b_3 + rc_4 = -3 + 0 \cdot 1 = -3$

$c_2 = b_2 + rc_3 + sc_4 = 2 + 0 \cdot (-3) - 1 \cdot 1 = 1$

$c_1 = b_1 + rc_2 + sc_3 = 0 + 0 \cdot 1 - 1 \cdot (-3) = 3$

The simultaneous equations for Δr and Δs are

$c_2 \Delta r + c_3 \Delta s = -b_1$ and $c_1 \Delta r + c_2 \Delta s = -b_0$

Substitute values of c_1, c_2, c_3 and b_0, b_1

$\Delta r - 3\Delta s = 0$ and $3\Delta r + \Delta s = 0$

Solving equations using Cramer's rule method

$D = c_2 \cdot c_2 - c_1 \cdot c_3 = 1 \cdot 1 - 3 \cdot (-3) = 10$

$D_1 = b_0 \cdot c_3 - b_1 \cdot c_2 = 0 \cdot (-3) - (0) \cdot 1 = 0$

$D_2 = b_1 \cdot c_1 - b_0 \cdot c_2 = (0) \cdot 3 - 0 \cdot 1 = 0$

$$\Delta r = \frac{D_1}{D} = \frac{0}{10} = 0$$

and $\Delta s = \dfrac{D_2}{D} = \dfrac{0}{10} = 0$

The new r and s are

$r = r + \Delta r = 0 = 0$

and $s = s + \Delta s = -1 = -1$

The approximate error in r and s

$$\left|\varepsilon_{a,r}\right| = \left|\frac{\Delta r}{r}\right| \times 100\,\% = \left|\frac{0}{0}\right| \times 100\,\% = 3262152642.45229$$

$$\left|\varepsilon_{a,s}\right| = \left|\frac{\Delta s}{s}\right| \times 100\,\% = \left|\frac{0}{-1}\right| \times 100\,\% = 0$$

(**Enter your problem**)

Now determine roots using r and s

$$x_{1,2} = \frac{r \pm \sqrt{r^2 + 4s}}{2}$$

$$x_{1,2} = \frac{0 \pm \sqrt{0 + 4 \cdot (-1)}}{2}$$

Now, divide the polynomial

$$\frac{x^4 - 3x^3 + 3x^2 - 3x + 2}{x^2 + 1}$$

$= x^2 - 3x + 2$ (This is nothing but the first 3 elements of b)

This quotient polynomial is a quadratic polynomial, so roots can be found using quadratic formula

$$x_{3,4} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_{3,4} = \frac{3 \pm \sqrt{9 - 4 \cdot 1 \cdot 2}}{2 \cdot 1}$$

$$x_{3,4} = \frac{3 \pm \sqrt{1}}{2}$$

$$x_{3,4} = \frac{3 \pm 1}{2}$$

$x_3 = 2, x_4 = 1$

So the roots of the equation are $+i, -i, 2, 1$

Iteration	$a_{i,n}$	$b_{i,n}$	$c_{i,n}$	Δr	Δs	r	s
1	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -2.9$ $b_2 = 2.81$ $b_1 = -3.009$ $b_0 = 1.9801$	$c_4 = 1$ $c_3 = -2.8$ $c_2 = 2.63$ $c_1 = -3.026$	-1.52284	-2.50503	-1.42284	-2.40503
2	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -4.42284$ $b_2 = 6.88798$ $b_1 = -2.16345$ $b_0 = -11.48752$	$c_4 = 1$ $c_3 = -5.84568$ $c_2 = 12.80044$ $c_1 = -6.31743$	0.74728	1.26624	-0.67556	-1.13879
3	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -3.67556$ $b_2 = 4.34429$ $b_1 = -1.74916$ $b_0 = -1.76557$	$c_4 = 1$ $c_3 = -4.35113$ $c_2 = 6.14497$ $c_1 = -0.94546$	0.54777	0.3716	-0.1278	-0.76719
4	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -3.1278$ $b_2 = 2.63253$ $b_1 = -0.93681$ $b_0 = 0.10007$	$c_4 = 1$ $c_3 = -3.25559$ $c_2 = 2.28138$ $c_1 = 1.2693$	0.19401	-0.1518	0.06621	-0.91899
5	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -2.93379$ $b_2 = 1.88676$ $b_1 = -0.17894$ $b_0 = 0.25423$	$c_4 = 1$ $c_3 = -2.86758$ $c_2 = 0.7779$ $c_1 = 2.50785$	-0.07565	-0.08292	-0.00944	-1.00192
6	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -3.00944$ $b_2 = 2.0265$ $b_1 = -0.00392$ $b_0 = -0.03035$	$c_4 = 1$ $c_3 = -3.01888$ $c_2 = 1.05308$ $c_1 = 3.01081$	0.00939	0.00198	-0.00005	-0.99994
7	$a_4 = 1$ $a_3 = -3$ $a_2 = 3$ $a_1 = -3$ $a_0 = 2$	$b_4 = 1$ $b_3 = -3.00005$ $b_2 = 2.00022$ $b_1 = -0.00023$ $b_0 = -0.0001$	$c_4 = 1$ $c_3 = -3.00011$ $c_2 = 1.00044$ $c_1 = 2.99965$	0.00005	-0.00006	0	-1
	$a_4 = 1$	$b_4 = 1$	$c_4 = 1$				

(Enter your problem)

8	$a_4 = -3$	$b_4 = -3$	$c_4 = -3$	0	0	0	-1
	$a_0 = 2$	$b_0 = 0$	$c_1 = 3$				

This material is intended as a summary. Use your textbook for detail explanation.
Any bug, improvement, feedback then Submit Here

1. (Method-1). Algorithm Formula :
(Previous example)

3. (Method-1). Example-2 and
(Next example)

Share this solution or page with your friends.

Home | What's new | College Algebra | Games | Feedback | About us

AtoZmath.com

NOW
PLAYING

(Enter your problem)