

```

> restart;
f := x → 0.2 * x^3 + x^2 - 1.9;

P := 3.4;  # b (positive side)
N := -5.1; # a (negative side)

for n from 2 to 16 do
  x[n] := evalf( (N*f(P) - P*f(N)) / (f(P) - f(N)) ); # corrected formula

  if f(x[n]) > 0 then
    P := x[n];
  elif f(x[n]) < 0 then
    N := x[n];
  else
    break; # exact root
  end if;

  print("Iteration =", n, "Approximation =", x[n], "f(x) =", f(x[n]));
end do;

```

$$f := x \mapsto 0.2 \cdot x^3 + x^2 - 1.9$$

$$P := 3.4$$

$$N := -5.1$$

$$x_2 := -4.068371697$$

"Iteration =", 2, "Approximation =", -4.068371697, "f(x) =", 1.18399679

$$x_3 := -4.407266788$$

"Iteration =", 3, "Approximation =", -4.407266788, "f(x) =", 0.40265005

$$x_4 := -4.506077941$$

"Iteration =", 4, "Approximation =", -4.506077941, "f(x) =", 0.10579164

$$x_5 := -4.530952125$$

"Iteration =", 5, "Approximation =", -4.530952125, "f(x) =", 0.02586622

$$x_6 := -4.536969588$$

"Iteration =", 6, "Approximation =", -4.536969588, "f(x) =", 0.00621221

$$x_7 := -4.538411085$$

"Iteration =", 7, "Approximation =", -4.538411085, "f(x) =", 0.00148555

$$x_8 := -4.538755587$$

"Iteration =", 8, "Approximation =", -4.538755587, "f(x) =", 0.00035487

$$x_9 := -4.538837870$$

"Iteration =", 9, "Approximation =", -4.538837870 , "f(x) =", 0.00008475

$$x_{10} := -4.538857521$$

"Iteration =", 10, "Approximation =", -4.538857521 , "f(x) =", 0.00002024

$$x_{11} := -4.538862211$$

"Iteration =", 11, "Approximation =", -4.538862211 , "f(x) =", 4.83×10^{-6}

$$x_{12} := -4.538863328$$

"Iteration =", 12, "Approximation =", -4.538863328 , "f(x) =", 1.17×10^{-6}

$$x_{13} := -4.538863602$$

"Iteration =", 13, "Approximation =", -4.538863602 , "f(x) =", 2.7×10^{-7}

$$x_{14} := -4.538863666$$

"Iteration =", 14, "Approximation =", -4.538863666 , "f(x) =", $6. \times 10^{-8}$

$$x_{15} := -4.538863680$$

"Iteration =", 15, "Approximation =", -4.538863680 , "f(x) =", $2. \times 10^{-8}$

$$x_{16} := -4.538863684$$

(1)

