

3) Example

#3^a

Example: Use the Bisection method to find solution accurate within 10^{-2} for

$$x^3 - 7x^2 + 14x - 6 = 0$$

on the interval $[0, 1]$

$$f(0) = -6 \quad f(1) = 2$$

n	a_n	b_n	p_n	$f(p_n)$
1	0	1	0.5	-0.625
2	0.5	1	0.75	0.984375
3	0.5	0.75	0.625	0.259766
4	0.5	0.625	0.5625	-0.161865
5	0.5625	0.625	0.59375	0.054
6	0.5625	0.59375	0.578125	-0.0526
7	0.578125	0.59375	0.5859375	0.001031
8	0.578125	0.5859375	0.58203125	-0.025716
9	0.58203125	0.5859375		

$$\frac{|p - p_7|}{|p|} \leq \frac{|a_8 - b_8|}{|a_8|} = \frac{0.0078125}{0.578125} = 0.01351$$

$p_7 = 0.5859375$ approximates the root.