

EXAMPLE: Find a real root of the equation $f(x) = x^3 + 3x - 5 = 0$ by method of bisection 5 with decimal point allowed.

Solution:

Let $x=0$; $f(0)=-5=-ve$

$x=1$; $f(1)=-1=-ve$

$x=2$; $f(2)=9=+ve$

Therefore, $f(1) = -1 = -ve$ and $f(2) = 9 = +ve$

Hence the root lies in between 1 and 2.

Assume, $a=1$ and $b=2$

steps	a	b	f(a)	f(b)	$c=(a+b)/2$	f(c)
1	1	2	-1	9	1.5	2.875
2	1	1.5	-1	2.875	1.25	0.703
3	1	1.25	-1	0.703	1.125	-0.201
4	1.125	1.25	-0.201	0.703	1.1875	0.237
5	1.125	1.1875	-0.201	0.237	1.15625	0.014
6	1.125	1.15625	-0.201	0.014	1.1406	-0.094
7	1.1406	1.15625	-0.094	0.014	1.1484	-0.040
8	1.1484	1.15625	-0.040	0.014	1.1523	-0.0131
9	1.1523	1.15625	-0.0131	0.014	1.15428	0.00076
10	1.1523	1.15428	-0.0131	0.00076	1.15339	-0.0055
11	1.15339	1.15428	-0.0055	0.00076	1.15384	-0.00232
12	1.15384	1.15428	-0.00232	0.00076	1.15406	-0.00078
13	1.15406	1.15428	-0.00078	0.00076	1.15417	-0.00001
14	1.15417	1.15428	-0.00001	0.00076	1.15423	0.0004
15	1.15417	1.15423	-0.00001	0.0004	1.1542	0.0002
16	1.15417	1.1542	-0.00001	0.0002	1.15419	0.00013
17	1.15417	1.15419	-0.00001	0.00013	1.15418	0.00006
18	1.15417	1.15418	-0.00001	0.00006	1.15418	X

Since step 17 and 18 show the same value, Hence the real root is 1.15418 Ans:

2π radian = 360 degree

π radian = 180 degree

$22/7$ radian = 180 degree

1 radian = $180/(22/7) = (180*7)/22 = 57.3$ degree

EXAMPLE: Find a real root of the equation $f(x) = x - \cos x = 0$ by method of bisection with 4 decimal point allowed.

Solution:

Solution:

Let $x=0$; $f(0)=0-\cos(57.3*0)=-1=-ve$

$x=1$; $f(1)=1-\cos(57.3*1)=1-0.730780=0.26922=+ve$

Therefore, $f(0) = -1 = -ve$ and $f(1) = 0.26922 = +ve$

Hence the root lies in between 1 and 2.

Assume, $a=0$ and $b=1$

steps	a	b	f(a)	f(b)	$c=(a+b)/2$	f(c)
1	0	1	-1	0.26922	0.5	1.4303
2	0	0.5	-1	1.4303	0.25	0.4367
3	0	0.25	-1	0.43673	0.125	-0.5127
4	0.125	0.25	-0.5127	0.43673	0.1875	0.43667
5	0.125	0.1875	-0.5127	0.43667	0.1563	1.0484
6	0.125	0.1563	-0.5127	1.0484	0.1407	0.347
7	0.125	0.1407	-0.5127	0.347	0.1329	-0.1037
8	0.1329	0.1407	-0.1037	0.347	0.1368	0.1215
9	0.1329	0.1368	-0.1037	0.1215	0.1349	0.011
10	0.1329	0.1349	-0.1037	0.011	0.1339	-0.0466
11	0.1339	0.1349	-0.0466	0.011	0.1344	-0.018
12	0.1344	0.1349	-0.018	0.011	0.1347	-0.00056
13	0.1347	0.1349	-0.00056	0.011	0.1348	0.00522
14	0.1347	0.1348	-0.00056	0.00522	0.1348	X

Since step 13 and 14 show the same value, Hence the real root is **0.1348**Ans:

X Wrong Math : <https://www.youtube.com/watch?v=93pogbFeLk4> ; He didn't convert radian to degree