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Section: A
P180034
Date:...../...../20.....

Assignment - 03

M□T□W□T□F□S□

$f(x) = x^2 - 81$

Root lie between
5 and 50

$f(5) = 25 - 81 = -56 < 0$

$f(50) = (50)^2 - 81$
$= 2500 - 81 = 2419 > 0$

$p_0 = \frac{5 + 50}{2} = \frac{55}{2}$

$p_0 = 27.5$

$f(p_0) = f(27.5) = (27.5)^2 - 81$

$= 756.25 - 81 = 675.25$

$f(p_0) = 675.25$

Root lie between 5 & 27.5

$f(5) = -56 < 0$ & $f(27.5) = 675.25 > 0$

$p_1 = \frac{5 + 27.5}{2} = \frac{32.5}{2}$

$p_1 = 16.25$

$f(p_1) = f(16.25) = (16.25)^2 - 81$

$f(p_1) = 264.0625 - 81$

$= 183.062 > 0$

Root lie between 5 & 16.25

$p_2 = \frac{5 + 16.25}{2} = \frac{21.25}{2}$

$p_2 = 10.625$ $f(p_2) = f(10.625)$

$f(10.625) = (10.625)^2 - 81$

$= 112.8906 - 81$

$= 31.890 > 0$

Root lie between 5 and 10.625

$p_3 = \frac{5 + 10.625}{2} = 7.812$

$f(p_3) = f(7.812) = (7.812)^2 - 81$

$= 61.027 - 81 = -19.97 < 0$

Root lie between 7.812 & 16.2

$p_4 = \frac{7.812 + 16.25}{2} = 12.031$

$f(p_4) = f(12.031) = (12.031)^2 - 81$

$= 144.744 - 81$

$= 63.744 > 0$

Root lie between 7.812 & 10.62

$p_4 = \frac{7.812 + 10.625}{2} = 9.218$

$f(p_4) = f(9.218) = (9.218)^2 - 81$

$= 84.980 - 81$

$= 3.98 > 0$

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Root lie between 7.812 and 9.218

$p_5 = \frac{7.812 + 9.218}{2}$

$= 8.515$

$f(p_5) = f(8.515)$

$f(8.515) = (8.515)^2 - 81$

$= 72.505 - 81$

$= -8.495 < 0$

Root lie between 8.515 and ~~7.812~~ 9.218

$p_6 = \frac{8.515 + 9.218}{2}$

$= ~~8.163~~ \ 8.866$

$f(p_6) = f(8.886) = ~~66.034 + 81~~$

$78.605 - 81 = -2.39 < 0$

$= ~~-14.365 < 0~~$

8.886 & 9.218

Root lie between ~~8.163~~ & ~~7.812~~

$~~p_7~~ = \frac{~~8.163~~ + 7.812}{2} = ~~7.98~~$

$p_7 = \frac{8.886 + 9.218}{2}$

$= 9.052$

$~~f(p_7) = f(9.052) = (9.052)^2~~$

$f(9.052) = (9.052)^2 - 81$

$= 81.938 - 81$

$= 0.938 > 0$

Root lie between 8.886 & 9.052

$p_8 = \frac{8.886 + 9.052}{2}$

$= 8.969$

$f(p_8) = f(8.969) = (8.969)^2 - 81$

$= 80.442 - 81$

$= -0.557 < 0$

Root lie between 8.969 & 9.052

$p_9 = \frac{8.969 + 9.052}{2}$

$= 9.010$

$f(p_9) = (9.010)^2 - 81$

$= 81.189 - 81$

$= 0.189 > 0$

Root lie between 8.969 & 9.010

$p_{10} = \frac{8.969 + 9.010}{2}$

$= 8.989$

$f(p_{10}) = f(8.989)$

$f(8.989) = 80.811 - 81$

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$= -0.189 < 0$

Root lie between 8.989 & 9.010

$p_{11} = \frac{8.989 + 9.010}{2}$

$= 8.999$

$f(p_{11}) = f(8.999)$

$f(8.999) = 80.98 - 81$

$= -0.02 < 0$

Root lie between 8.999 and 9.010

$p_{12} = \frac{8.999 + 9.010}{2}$

$= 9.004$

$f(p_{12}) = f(9.004)$

$f(9.004) = (9.004)^2 - 81$

$81.07 - 81$

$= 0.07 > 0$

Root lie between 8.999 & 9.004

$p_{13} = \frac{8.999 + 9.004}{2}$

$= 9.0015$

$f(p_{13}) = f(9.0015)$

$= (9.001)^2 - 81$

$= 81.018 - 81$

$= 0.018 > 0$

Root lie between 8.999 & 9.0015

$p_{14} = \frac{8.999 + 9.001}{2}$

≈ 9.000

$f(p_{14}) = (9.000) - 81$

$= 81.000 - 81$

$= 0.000$

So root is '9'

RESULT

Step	a	b	p	f(x)
	~~5~~	~~50~~		
p_0	5	50	27.5	675.25
p_1	5	27.5	16.25	183.062
p_2	5	16.25	~~18.890~~ 18.625	31.890
p_3	5	10.625	7.812	-19.97
p_4	7.812	10.625	9.218	3.98
p_5	7.812	9.218	8.515	-8.495
p_6	8.515	9.218	8.866	-2.39
p_7	8.886	9.218	9.052	0.938
p_8	8.886	9.052	8.969	0.557
p_9	8.969	9.052	9.010	0.189
p_{10}	8.969	9.010	8.989	-0.189
p_{11}	8.989	9.010	8.999	-0.02
p_{12}	8.999	9.010	9.004	0.07
p_{13}	8.999	9.004	9.0015	0.018
p_{14}	8.999	9.001	9.000	0.000
p_{15}				