Chapter-19 Numerical Computation dw ORale: Miller Land Contractive - 19.1 1. Apply the method of successive bisection to find the a. Square root of 3 within 2 places of Lecimal in (1,2) Solution: Let 2 = V3 or,  $x^2 - 3 = 0$ Let (f(x) = x2-3 -0 Here, a = 1, b = 2 then, f(1) = 012-3=5-2 < 605.00 3 F(2) = 22-3 = 1 > 0 2 still 05.61 20.0025 H = 2 10.36, wo N 1. C2 160 = 1 f (m) = m2-3 11 1500 - a0 1 1 1 2 5 0 0 2 1 5 0 0 1 0 0 0 7 15 0 5 0 0 Pt 1- 1.5600 2 65.0 Parts 11 0:0625 astrong - 1-5 1.75 1.625 1 - 0-359375 50 01.6250 1.750 1.6875 -0.15234375 1.68750 1-750 1.71875 -0.0458980 PRODUIL 1-71875 1.75(00)-1.73437 0.0080 211 28430 2017 1.71875 1.73437 1.726561 -0.01899 MEERO 1.72656 1.73437 1.73046 -0.00547 1.73046 1-73437 1-732415 0.00126 Hence the required root is 1.73.

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1									
			. 11.	n -lane	of decima	1 in			
b.	Square root of 123 within 2 places of decimal in								
Al La	(11, 12)								
5,1)	Solvtion:	la lanaly	5 3017 (1) 3	E 40 600	( ) ( ) ( ) ( ) ( ) ( )				
	let x = 1	23			1016010				
	Then, x2-1		<u> </u>	P	V = 3 10				
	Now			10 = 8	7 10				
	a	6	Me a+b	f(a)	t(P)	f(m)			
	11	12	11.5	5-2	1 21 000	9.25			
	11	11.5	11.250	5-2 8-	19.25	3-5625			
	11	11.25	11.1250	< 1-2 8-	3.56	0.76			
	11	11.125	11.6625	-2	0.76	1-0.62			
	11.0625	11.125	11.09375	-0.62	0.76	0.071			
	11.0625	11.09375	11.078125		0.071	-0.27			
	11.078125	11.09375	11.0859375		0.071	-6.101			
	11.0859375	11.09375	11.68284375		0.071	- 0.01			
	11.08984375		11-09179688		0.071	0.02			
		11.09179688			0.02	10.006			
<del></del> ,	11.	· ·			0.006	co -0.004			
		11.09082032		And the second					
	11.07033209	11.09082032			0.006	0.0008			
	1. 11	11200.0	1 3 1103 f · (	felle for	13266 6				
	Hence, the	required	700+ 15 11	.0908	C SPORT.				
					3				
,				s hariant	-16.00	9/1			
						1			

			zhaj	·					
c.	The approximat	e value of	V2 Wilhin an	error of 10-3.					
10.4	Solution: Employed, of x solid to whoms for to								
	let, x = V2								
	or, 22-2=0	March Care	17. 1213 145						
	(e) f(x) = x2-	_	1 + 1						
	Now, f(1) = 12-2			194					
	$f(2) = 2^2 -$								
	and f(1) f(2):		< 0	77					
	So, the root lie		The state of the s	w adt III					
	li .	> BEAMCON I	2018	alulas I					
	Now,	Ь	Me atb	f(m)=m2-2					
	1	2	1.5	0.25					
	1	9.5 0.00		- 0.4375					
*	1.25		0(1.375 (2)7	-0.109					
	1.375		1.4375	0.6664					
	1.375		1-40625 (1)	-0.0224					
	1.40625		11.421875	0.0217					
. 1	1.40625	2.2 0.0.12	14140625	-0.000427					
· ·	2 (1-0 c f.(1)	Construction of the Constr	E- Charles Finds	Parall Same					
	Here & 1 f(m)   = 1	-0.0004271	1 6 2 5 3 1 2 2	29 4 3					
	1700 1 300 E	0.000427 < 1		5					
	Legal a dock di	5401, 05 5	18-11 105-8	5 7. 1 · C					

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Wewton-Raphson Method

Let us consider  $f(\pi) = \chi^2 - a$ , then Newton's Interation equation

are given by:  $\chi_{n+1} = \chi_n - f(\chi_n)$ 

f'(xn)

i.e. 76/n+1 = 2n - 26/n - a

1.d. the Value of \$\frac{3}{10} with error not more than 0.03.

Solution:

let z = Vio M

or, x3-10=0

Now, & Let f(x) = x3-10=0-0

Then, f(2) = 23-10 = -2

f(3) = 9 10 27-10 = 17

and f(2).f(3)= -34<6

	:. The	root lies	between	2 and 3	\$ 15 5 . )	ON IS TO	11.42
+	a A	b 100	mc a+b	f(a)	t(P)	t(w)	b-a
-		3	2.5	- 2	17	5.625	14
	2	2.5	2.25	107230	5.625	1.3906	
_	2	/	2.125	- (T-Z)30.	1.3906	-0.4042	
		2.25	4.375	-0.4042	1.3006	73.7402	
_	2.125	2·25 4·375	32565	-0.4042	73.7402	1	
	2-125	7.379	,				,
		_	( )				118
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2.	Apply	the	method	of	Successive	bisection	to And	the
>	oot of	the	equation.		. 50.	0 70 0	(R) 1917	

a. x2 + x-4 = 0 in (1,2) correct to two places of Lecimal. Solution:

Let f(x) = x2 + x-4 then, = = (e)  $f(1) = 1^2 + 1 - 4 = -2$ 

f(2) = 22 + 2- 4 = 12 months de sit lance sol

90, f(1).f(2) = -4<0

1. Th	e root lies	s between 1	and 2	1	
a	b	me atb	f (a)	f(P)	f(m)
C 1 est	2	17.17.5	-2	2.1.1	-0.25
1.55	1-52	511.45	2-0.25	21.1	0.8125
1.5	1.75	11.625	-0.25	0.8125	0.2656
1.5	1.625	1.5625	-0.25	0.2656	0.00 39
1.5	1.5625	1353125	-0.25	0.0039	-0.124
	1.5625	1.546875	-0.124	0.0039	1-0.060
1-53125	1.5625	1.5546875	- 0.0603	0.0039	- 6.628
1.546875		1.55859375		0.003917	-0.012
		1.560546875		0-00390	1-0.004
1.55859375			-0.00414		- 0.00012
1.566546835	1.0000	2003020100	000121		

Hence, the required root is 1.56

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	the state of the s								
b.	2x2-x-5=0 Correct to 4 places of decimals within								
	an error of 0.05.								
	Solution:								
	Let, f(x) =	2x2-x-5=0	then.	· Maxy	SX 10				
1.2 400		$1^2 - 1 - 5 = -$		no 16	0/08				
		$2^2 - 2 - 5 =$		(x) 1	100				
				e, (1)	7				
	50, F(2). F(			3 - ( - )	7				
		at lies between	me atb	f(a)	£(P)	F(m)			
	a	Ь			1	-2			
	1	2 4,000 t a	3.12.5 seil to	-c-M	- 4	-0.62			
4)7	1.5	(2)	1.75	-2	1				
	1.75	2	1.875	5-0.625	1	0.15			
c12-0	1.75	1.875	1.8125	-0.625	0.156	-0.24			
) C-1	1.875	2.8325	1.84375	0.156	- 0-24	-0.01			
A V. 6	1.84375	2.8125	1.828125	- 0.044	- 0-24	-0.14_			
	1.828125	1.8125	1.8203125	-0.144	-0.24	-0-19-			
(10		1.8125	1.81640625	-0.19	-0.24	-0-21			
0.0	1.8203125		1.814453125		- 0.24	-6.22			
,00	1.81640625	1.8125	1.813476563		-0.24	-6.23			
(-)-1	1.814453125	1.8125		1	-0.24	-0.23			
0.0	1.813476563	(2.8)25	1.812988282		130				
00.0	-	divasor Si	1 (3125 1 52)	2-(	DJC II				
			3	11	1				
		1 1 7.7	have brief	N 1 - 1 - 1 -	hirl .				
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