Math 153
Spring 2019
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SOLUTIONS TO EXERCISES FROM `math153exercises01a.pdf`

8. Here is the analog of the tables in **http://math.ucr.edu~res/math153-2019/history01c.pdf**:

LX	LY	RX	RY	TRIAL	f(TRIAL)	
0.5	-4	1	1	0.9	-0.568	**f(x) = 8x^3-6x-1**
0.9	-0.568	1	1	0.93622449	-0.052418768	
0.93622449	-0.052418768	1	1	0.93940101	-0.004428329	
0.93940101	-0.004428329	1	1	0.93966818	-0.000371257	
0.93966818	-0.000371257	1	1	0.93969057	-3.1105E-05	
0.93969057	-3.1105E-05	1	1	0.93969245	-2.60594E-06	
0.93969245	-2.60594E-06	1	1	0.93969261	-2.18321E-07	
0.93969261	-2.18321E-07	1	1	0.93969262	-1.82905E-08	
0.93969262	-1.82905E-08	1	1	0.93969262	-1.53234E-09	
0.93969262	-1.53234E-09	1	1	0.93969262	-1.28377E-10	

9. Here is the analog of the tables in **http://math.ucr.edu~res/math153-2019/history01c.pdf**:

LX	LY	RX	RY	TRIAL	f(TRIAL)	**f(x) = x^3-2**
1	-1	2	6	1.14285714	-0.50728863	
1.14285714	-0.50728863	2	6	1.20967742	-0.229855493	
1.20967742	-0.229855493	2	6	1.238837	-0.098735647	
1.238837	-0.098735647	2	6	1.25115987	-0.041433057	
1.25115987	-0.041433057	2	6	1.25629553	-0.01721583	
1.25629553	-0.01721583	2	6	1.25842334	-0.007123928	
1.25842334	-0.007123928	2	6	1.25930278	-0.00294286	
1.25930278	-0.00294286	2	6	1.2596659	-0.001214823	
1.2596659	-0.001214823	2	6	1.25981577	-0.000501338	
1.25981577	-0.000501338	2	6	1.25987761	-0.000206869	
1.25987761	-0.000206869	2	6	1.25990313	-8.53568E-05	
1.25990313	-8.53568E-05	2	6	1.25991365	-3.52186E-05	
1.25991365	-3.52186E-05	2	6	1.259918	-1.45313E-05	
1.259918	-1.45313E-05	2	6	1.25991979	-5.9956E-06	
1.25991979	-5.9956E-06	2	6	1.25992053	-2.47378E-06	
1.25992053	-2.47378E-06	2	6	1.25992084	-1.02068E-06	
1.25992084	-1.02068E-06	2	6	1.25992096	-4.21131E-07	
1.25992096	-4.21131E-07	2	6	1.25992101	-1.73758E-07	
1.25992101	-1.73758E-07	2	6	1.25992103	-7.16925E-08	
1.25992103	-7.16925E-08	2	6	1.25992104	-2.95803E-08	
1.25992104	-2.95803E-08	2	6	1.25992105	-1.22048E-08	
1.25992105	-1.22048E-08	2	6	1.25992105	-5.03568E-09	

10. The base **2** expansion of $\boldsymbol{k}$ has the form $\boldsymbol{c_{n-1}2^{n-1} + \ldots + c_1 2 + c_0}$ where each $\boldsymbol{c_j}$ equals **0** or **1.** Therefore we also have

$$\frac{k}{2^n} = \frac{c_{n-1}}{2} + \ldots + \frac{c_{n-k}}{2^k} + \ldots + \frac{c_0}{2^n}$$

where each numerator on the right hand side is either **0** or **1.** If we remove the terms with zeros in the denominator**,** the remaining terms have ones and hence the right hand side is an Egyptian fraction expansion**.**■