THE JAPANESE ABACUS, ITS USE AND THEORY

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Exercises

Constant daily practice is essential if one is to become proficient in the use of the abacus. The following exercises, prepared and arranged in accordance with the most up-to-date methods, have been kindly furnished by Professor Miyokichi Ban, an outstanding abacus authority. They will provide a good beginning for the serious student, who can then find more problems in any ordinary arithmetic book. Also note that problems in multiplication and division may be used as problems in addition and subtraction respectively.

The exercises are arranged so that a student can measure his progress against the yardstick of the Japanese licensing system, the required standard of proficiency for the particular grade being given at the beginning of each group. The possessor of a first, second or third grade license, as awarded by the Abacus Committee, is officially qualified for employment in a public corporation or business house. Licenses for the lower grades are given on the basis of unofficial examinations conducted by numerous private abacus schools.

The exercises are also chosen to give the maximum of variety to the problems, with each digit from zero to nine receiving equal attention -an essential requirement for improvement in abacus operation. The system followed is that just initiated by the Central Abacus Committee after long and careful research.

I -Sixth Grade Operator

Group A
(1 set per minute, or entire group with 70% accuracy in 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
528	967	482	106	815	360	769	241	654	185
160	239	251	543	302	829	420	952	516	730
427	650	147	928	491	213	195	309	740	698
951	108	598	710	852	308	–513	756	495	246
719	243	120	954	–169	497	–854	487	536	809
452	758	–643	329	–401	932	508	360	–785	953
106	491	–839	267	–958	589	274	617	–320	721
843	536	304	695	576	690	421	508	–197	370
385	702	987	514	740	147	963	873	201	617
690	871	439	870	183	674	–307	420	873	164
724	460	-671	308	–235	850	–631	196	124	902
381	629	–305	796	–673	201	–175	689	–482	596
203	984	–526	632	340	765	286	204	–968	480
579	315	760	807	927	148	840	795	319	342
634	870	215	481	264	756	392	138	203	875
7 782	**8 823**	**1 319**	**8 940**	**3 054**	**7 959**	**2 588**	**7 545**	**1 909**	**8 688**

Group B
(1 set per minute or entire group with 70% accuracy in 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
728	36	627	52	271	13	806	4 105	936	3 094
631	87	75	718	6 104	624	54	78	21	65
4 089	52	238	60	42	51	–716	29	6 084	413
50	705	–94	42	35	379	–81	712	–18	817
92	68	–426	8 096	487	785	439	67	–745	23
175	96	–81	621	93	41	5 021	834	–50	71
47	349	7 513	97	312	2 095	48	203	62	938
904	2 138	59	481	–78	36	27	40	329	26
72	510	60	305	–5 083	984	–78	526	–1 203	7 041
593	74	–3 041	574	20	63	–3 605	81	–459	86
61	421	-52	85	961	542	–953	9 036	48	259
86	907	139	19	–854	807	130	17	76	95
8 260	53	807	73	–69	1 068	69	395	597	508
354	619	40	9 038	–705	70	92	58	30	672
13	8 042	968	264	96	92	247	649	817	40
16 155	**14 157**	**6 832**	**20 525**	**1 632**	**7 650**	**1 500**	**16 830**	**6 525**	**14 148**

Group C
(70% accuracy, 5 minutes.)

(1) 187 x 53 = **9 911**
(2) 245 x 21 = **5 145**
(3) 309 x 19 = **5 871**
(4) 408 x 38 = **15 504**
(5) 561 x 60 = **33 660**
(6) 620 x 42 = **26 040**
(7) 716 x 90 = **64 440**
(8) 832 x 57 = **47 424**
(9) 954 x 74 = **70 596**
(10) 973 x 86 = **83 678**

Group D
(70% accuracy, 5 minutes.)

(1) 1 725 x 51 = **87 975**
(2) 2 698 x 24 = **64 752**
(3) 3 980 x 30 = **119 400**
(4) 4 509 x 65 = **293 085**
(5) 5 062 x 73 = **369 526**
(6) 6 874 x 68 = **467 432**
(7) 7 431 x 80 = **594 480**
(8) 8 146 x 12 = **97 752**
(9) 9 357 x 49 = **458 493**
(10) 8 230 x 97 = **798 310**

Group E
(70% accuracy, 5 minutes.)

(1) 960 / 24 = **40**
(2) 810 / 45 = **18**
(3) 7 505 / 79 = **95**
(4) 6 640 / 80 = **83**
(5) 5 920 / 16 = **370**
(6) 4 080 / 68 = **60**
(7) 3 127 / 53 = **59**
(8) 2 160 / 30 = **72**
(9) 1 152 / 72 = **16**
(10) 2 184 / 91 = **24**

Group F
(70% accuracy, 5 minutes.)

(1) ¥ 986 / 34 = ¥ **29**
(2) ¥ 855 / 19 = ¥ **45**
(3) ¥ 7 280 / 80 = ¥ **91**
(4) ¥ 6 240 / 78 = ¥ **80**
(5) ¥ 5 092 / 67 = ¥ **76**
(6) ¥ 4 128 / 96 = ¥ **43**
(7) ¥ 390 / 13 = ¥ **30**
(8) ¥ 2 320 / 40 = ¥ **58**
(9) ¥ 1 550 / 25 = ¥ **62**
(10) ¥ 884 / 52 = ¥ **17**

II -Fifth Grade Operator

Group A
(70% accuracy, 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
425	619	502	7 245	167	895	3 471	912	237	498
839	153	698	461	9 035	7 043	584	463	4 093	6 309
5 302	762	2 013	956	716	509	628	9 324	308	146
791	8 523	147	179	3 540	2 918	309	647	7 410	285
514	–478	9 684	317	295	451	5 672	1 509	–984	5 037
1 283	–694	5 726	420	138	734	491	854	–2 536	708
960	–7 081	409	8 096	869	1 086	–236	6 082	–841	3 572
2 048	377	971	–543	327	427	–7 018	165	965	219
683	1 049	3 056	–835	5 609	308	4 763	978	8 074	867
4 067	812	843	2 684	952	872	517	240	129	421
794	9 235	329	708	4 786	164	902	2 086	715	1 653
3 176	–504	760	1 032	128	6 217	8 059	731	–5 268	820
952	–6 380	4 215	–319	8 073	9 620	–126	3 108	–607	9 046
805	426	837	–908	409	563	–340	597	259	714
671	905	158	–6 527	241	35	–895	375	136	935
23 310	**7 724**	**30 348**	**12 966**	**35 285**	**31 842**	**16 781**	**28 071**	**12 090**	**31 230**

Group B
(70% accuracy, 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3 128	504	196	837	6 059	463	958	7 342	217	592
940	6 142	2 501	7 590	3 240	8 594	149	3 180	1 048	403
8 437	879	385	2 601	918	3 027	4 807	453	9 731	1 780
1 056	–5 263	6 210	9 082	136	–7 380	758	9 508	5 109	6 814
9 582	–198	1 479	–649	2 847	–2 759	3 146	4 261	8 925	509
865	7 920	8 937	–3 078	9 325	–902	6 291	937	–2 346	7 921
5 297	691	7 068	–429	1 706	6 178	530	8 679	–697	2 078
7 809	4 702	927	8 563	695	4 813	2 085	518	7 163	8 637
254	9 087	4 253	930	8 014	632	5 239	6 024	3 508	981
2 375	6 815	5 406	–358	4 587	9 264	7 621	2 187	4 386	3 146
718	3 960	8 045	–1 876	273	850	1 375	9 840	–6 029	4 065
6 042	–1 536	712	–6 145	7 208	1 096	8 407	5 706	–275	8 254
163	–8 473	9 634	7 201	462	–5 709	4 362	695	–5 314	672
4 301	–348	843	5 914	3 159	–641	9 024	1 039	430	5 890
649	2 057	3 521	726	5 341	175	613	726	852	9 763
52 616	**26 939**	**60 117**	**34 909**	**53 970**	**25 701**	**55 365**	**61 095**	**26708**	**61 505**

Group C
(70% accuracy, 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
359	9 535	604	413	2 190	4 157	516	8 594	740	1 507
7 569	174	2 895	390	647	823	7 082	250	6 294	960
408	812	731	706	574	496	395	913	103	8 023
163	3 720	1 048	6 054	1 697	273	279	–341	857	649
914	–647	269	318	481	5 082	153	–7 082	5 019	752
792	–1 093	817	8 249	156	761	6 042	361	431	836
5 021	356	4 580	–634	3 078	–845	821	2 473	520	6 395
8 630	2 680	932	–267	423	–3 978	3 150	749	648	548
325	906	126	–9835	310	–109	264	605	3 976	125
206	185	658	142	962	634	4 987	128	837	409
127	–263	9 053	5 061	835	2 014	730	9 086	2 719	287
4 381	–8 472	316	975	5 289	361	674	–597	301	9 168
948	–598	470	–7 529	206	–580	968	–1 632	4 658	314
6 057	704	3 749	–807	4 058	–6 792	401	–805	285	7 431
874	419	527	182	739	905	5 893	467	961	270
36 774	**8 418**	**26 775**	**3 418**	**21 645**	**3 202**	**32 355**	**13 169**	**28 349**	**37 674**

Group D
(70% accuracy 5 minutes.)

(1) 942 x 495 = **466 290**
(2) 839 x 457 = **383 423**
(3) 723 x 980 = **708 540**
(4) 680 x 134 = **91 120**
(5) 508 x 268 = **136 144**
(6) 417 x 873 = **364 041**
(7) 396 x 629 = **249 084**
(8) 204 x 316 = **64 464**
(9) 165 x 501 = **82 665**
(10) 751 x 702 = **527 202**

Group E
(70% accuracy 5 minutes.)

(1) 848 x 276 = **234 048**
(2) 854 x 965 = **824 110**
(3) 902 x 804 = **725 208**
(4) 627 x 108 = **67 716**
(5) 105 x 519 = **54 495**
(6) 570 x 843 = **480 510**
(7) 489 x 751 = **367 239**
(8) 613 x 397 = **243 361**
(9) 236 x 632 = **149 152**
(10) 791 x 420 = **332 220**

Group F
(70% accuracy 5 minutes.)

(1) 9 724 /26 = **374**
(2) 8 151 /13 = **627**
(3) 7 739 /71 = **109**
(4) 62 560 /80 = **782**
(5) 5 556 /12 = **463**
(6) 49 572 /54 = **918**
(7) 30 150 /67 = **450**
(8) 23 128 /98 = **236**
(9) 17 535 /35 = **501**
(10) 43 855 /49 = **895**

Group G
(70% accuracy 5 minutes.)

(1) 63 207 / 90 = **7 02.3**
(2) 533 484 / 87 = **6 132**
(3) 420 616 / 74 = **5 684**
(4) 113 148 / 63 = **1 796**
(5) 278 772 / 52 = **5 361**
(6) 85 075 / 41 = **2 075**
(7) 366 873 / 39 = **9 407**
(8) 98 504 / 28 = **3 518**
(9) 72 885 / 15 = **4 859**
(10) 214240 / 26 = **8 240**

III -Fourth Grade Operator

Group A ***(70% accuracy, 10 minutes.)***

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
6 374	4 561	3 458	9 526	1 459	7 201	2 951	5 482	8 954	6 753
5 021	9 753	2 983	4 198	3 146	6 759	9 160	8 035	4 710	1 832
7 913	3 670	4 120	8 973	4 723	1 093	3 294	4 973	3 986	8 094
9 265	–1 256	6 309	7 269	2 368	2 346	8 643	5 106	5 603	2 869
4 537	–5 904	5 092	9 085	6 912	8 712	–4 712	3 683	9 215	7 150
5 084	8 329	2 148	–6 450	5 279	6 507	–1 035	1 290	5 087	3 908
8 762	2 048	5 871	–8 317	2 905	3 874	–5 368	9 624	1 693	9 201
7 190	6 827	1 397	–3 802	7 816	4 158	7 214	2 067	6 854	4 127
3 856	–7 895	7 539	1 236	3 047	8 527	6 870	6 541	2 401	9 382
4 280	–3 047	2 710	7 084	8 102	4 096	5 907	3 712	–6 049	5 240
8 152	–2 739	6 087	6 735	5 680	3 648	–7 582	6 154	–8 731	8 476
2 409	6 180	8 264	–4 391	9 834	5 930	–4 326	7 298	–3 278	6 395
6 371	5 912	4 675	–5 140	5 091	2 489	8 059	4 870	7 142	7 564
1 948	4 106	9 561	2 604	6 470	1 360	9 781	7 951	9 320	5 013
9 603	1 438	3 406	5 172	7 538	9 125	6 403	8 309	7 562	4 671
90 675	**31 983**	**73 620**	**33 782**	**80 370**	**75 825**	**45 259**	**85 095**	**54 469**	**90 675**

Group B
(70% accuracy, 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2 453	5 906	3 629	8 431	9 504	6 712	72 934	1 846	4 165	8 679
5 192	98 710	41 568	7 846	1 029	8 950	1 653	30 782	1 594	15 032
67 941	4 825	9 205	20 753	85 934	4 167	3 817	4 935	3 872	6 985
36 029	5 174	80 453	4 501	2 318	60 843	9 051	8 071	51 943	2 803
1 683	9 631	–2 687	59 327	–7 840	6 679	1 329	6 329	92 381	41 697
4 808	3 712	–31 405	7 698	–43 126	1 703	–53 682	95 874	–6 705	9 306
8 574	20 893	8 716	3 086	–2 735	29 078	–8 306	3 105	–4 372	5 821
3 129	8 074	4 932	64 279	3 052	8 634	–2 148	5 763	–87 156	4 068
48 531	2 689	–17 043	1 058	9 607	39 581	80 597	78 491	9 034	37 459
4 067	60 243	–5 890	6 912	17 269	7 824	5 431	40 982	13 507	2 516
73 215	87 069	–9 134	2 769	8 573	2 307	14 970	2 417	5 420	70 128
2 750	1 574	4 716	90 635	–54 618	40 592	–7 026	7 650	7 263	8 749
10 896	6 458	76 352	5 804	–6 481	91 486	–25 469	63 208	–20 489	3 290
7 208	53 961	2 879	8 140	70 396	6 251	4 205	9 016	–8 016	9 347
9 645	2 307	5 021	1 972	4 125	8 095	6 748	2 569	2 698	60 175
286 121	**371 226**	**171 312**	**293 211**	**97 007**	**322 902**	**104 104**	**361 038**	**65 139**	**286 055**

Group C
(70% accuracy, 10 minutes.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2 701	58 976	378	683	8 472	4 583	75 219	839	13 597	9 218
342	4 109	917	50 746	601	13 659	327	523	763	40 137
60 179	249	4 586	–1 597	7 340	732	139	19 768	27 458	572
9 630	80 651	1 469	–265	45 981	403	–6 875	5 017	89 162	1 065
71 524	1 590	70 854	619	790	29 581	–906	240	430	56 387
8 495	–468	3 042	7 301	13 267	690	50 864	6 754	2 049	941
50 723	–5 107	793	25 478	6 154	32 071	8 542	30 482	–98 625	259
268	–67 328	2 138	9 032	24 896	947	41 038	1 937	–506	7 308
956	782	96 205	–359	974	8 765	–751	684	–4 317	32 596
814	8 245	7 621	–40 168	32 058	1 296	–60 213	93 521	5 231	483
5 209	92 361	5 839	–8 274	613	95 820	–2 496	8 075	70 318	60 725
43 167	873	19 057	63 921	50 789	7 415	9 547	42 816	–2 679	864
1 083	70 934	415	34 580	9 523	178	37 081	7 109	–985	24 139
548	–3 012	80 246	904	862	80 264	320	24 365	6 140	8 074
86 937	–654	8 120	2 817	1 035	6 304	4 693	690	804	1 690
342 576	**242 201**	**361 180**	**145 418**	**203 355**	**282 708**	**156 529**	**242 820**	**108 840**	**244 458**

Group D
(70% accuracy 5 minutes.)

(1) 92 854 x 84 = **7 799**
(2) 8 240 x 568 = **4 680**
(3) 73 041 x 90 = **6 573**
(4) 60 378 x 16 = **966 048**
(5) 51 762 x 27 = **1 397**
(6) 47 609 x 70 = **3 332 630**
(7) 30 427 x 32 = **973 664**
(8) 29 185 x 63 = **1 838**
(9) 18 596 x 45 = **836 820**
(10) 54 930 x 81 = **4 449**

Group E
(70% accuracy 5 minutes.)

(1) 1 375 x 562 = **772 750**
(2) 2 610 x 148 = **386 280**
(3) 3 784 x 625 = **2 365 000**
(4) 4 208 x 201 = **845 808**
(5) 5 429 x 874 = **4 744 946**
(6) 6 057 x 903 = **5 469 471**
(7) 7 906 x 417 = **3 296 802**
(8) 8 591 x 730 = **6 271 430**
(9) 9 832 x 986 = **9 694 352**
(10) 4 163 x 359 = **1 494 517**

Group F
(70% accuracy 5 minutes.)

(1) 9 108 x 379 = **3 451 932**
(2) 8 240 x 568 = **4 680 320**
(3) 7 894 x 740 = **5 841 560**
(4) 6 372 x 953 = **6 072 516**
(5) 5 423 x 182 = **986 986**
(6) 4 617 x 194 = **895 698**
(7) 3 581 x 807 = **2 889 867**
(8) 2 056 x 625 = **1 285 000**
(9) 1 905 x 401 = **763 905**
(10) 3 769 x 236 = **889 484**

Group G
(70% accuracy 5 minutes.)

(1) 2 647 x 3 740 = **9 899 780**
(2) 3 068 x 2 698 = **8 277 464**
(3) 9 854 x 7 219 = **71 136 026**
(4) 1 370 x 4 805 = **6 582 8508**
(5) 8 401 x 6 457 = **54 245 257**
(6) 4 936 x 9 523 = **47 005 528**
(7) 6 125 x 5 184 = **31 752 000**
(8) 2 519 x 8 306 = **20 922 814**
(9) 7 093 x 1 962 = **13 916 466**
(10) 5 782 x 3 071 = **17 756 522**

Group H
(70% accuracy 5 minutes.)

(1) 379 428 / 42 = **9 034**
(2) 706 860 / 85 = **8 316**
(3) 235 662 / 31 = **7 602**
(4) 658 145 / 97 = **6 785**
(5) 406 164 / 68 = **5 973**
(6) 87 362 / 19 = **4 598**
(7) 115 710 / 30 = **3 857**
(8) 55 637 / 23 = **2 419**
(9) 94 240 / 76 = **1 240**
(10) 325 134 / 54 = **6 021**

Group I
(70% accuracy 5 minutes.)

(1) 94 235 / 401 = **235**
(2) 87 040 / 256 = **340**
(3) 752 128 / 832 = **904**
(4) 64 220 / 380 = **169**
(5) 548 784 / 927 = **592**
(6) 431 748 / 603 = **716**
(7) 385 746 / 478 = **807**
(8) 219 537 / 519 = **423**
(9) 107 912 / 164 = **658**
(10) 620 895 / 795 = **781**

Group J
(70% accuracy 5 minutes.)

(1) 636 768 / 792 = **804**
(2) 35 984 / 208 = **173**
(3) 194 394 / 537 = **362**
(4) 403 425 / 815 = **495**
(5) 86 163 / 373 = **231**
(6) 531 340 / 620 = **857**
(7) 932 832 / 984 = **948**
(8) 286 090 / 469 = **610**
(9) 363 726 / 501 = **726**
(10) 74 314 / 146 = **509**

Group K
(70% accuracy 5 minutes.)

(1) 553 149 / 6 829 = **81**
(2) 273 375 / 3 645 = **75**
(3) 97 351 / 1 453 = **67**
(4) 761 664 / 7 934 = **96**
(5) 81 018 / 4 501 = **18**
(6) 84 942 / 2 178 = **39**
(7) 424 901 / 8 017 = **53**
(9) 120 048 / 5 002 = **24**
(9) 611 640 / 6 796 = **90**
(10) 394 044 / 9 382 = **42**

IV - Third Grade Operators

***Group** A*
***(70% accuracy, 5 minutes.**)*

(1)	(2)	(3)	(4)	(5)
8 127	526	105 942	41 306	28 640
659	4 192	835	7 962	135
17 492	60 271	94 516	95 641	86 029
961 037	358 604	62 481	529	401 286
5 208	–963	83 672	890 375	514
638 125	–71 850	1 450	–6 813	37 269
80 734	–5 397	238 107	–380 276	2 478
9 270	409 715	396	784	903 851
25 816	842	740 138	978 250	18 394
401 369	–17 438	253	3 795	549 076
756	–732 609	57 048	12 047	3 702
36 594	90 386	6 729	604 518	153
520 943	6 127	78 915	–421	695 718
481	28 459	406 329	–53 608	4 367
74 308	813 045	9 067	29 134	70 925
2 780919	**943 910**	**1 885 878**	**2 164 955**	**2 802 537**

(6)	(7)	(8)	(9)	(10)
350 624	79 328	60 382	952	14 538
93 041	8 653	847	38 207	751
–68 729	184 705	2 415	706 394	26 374
–134	31 894	531	2 460	652 096
791 560	936	891 270	875	8 725
45 287	507 269	63 092	410 936	479 163
2 759	421	–726	9 283	680
59 641	60 584	–308 619	65 148	13 849
–6 358	245 139	–15 974	931 054	804 975
–804 293	372	704 368	729	5 812
–15 807	4 715	–3 051	54 071	30 427
983	693 807	–57 249	13 567	209
7 410	16 042	425 698	6 182	90 412
362	2 610	9 703	207 648	587 936
201 876	80 597	56 184	89 513	3 160
658 222	**1 917 072**	**1 828 871**	**2 537 019**	**2 719 107**

Group B

(70% accuracy 10 minutes. Calculate problems 1-10 to the nearest thousandth; 11-20 to the nearest dollar.)

(1) 4 097 x 238 = **975 086**
(2) 5 638 x 149 = **840 062**
(3) 14 902 x 52 = **774 904**
(4) 7 105 x 0.098 = **696.29**
(5) 9 674 x 603 = **5 833 422**
(6) 63.25 x 7.64 = **483.23**
(7) 853 x 4.017 = **3 426.501**
(8) 0.3081 x 0.926 = **0.285**
(9) 2 984 x 351 = **1 047 384**
(10) 0.2176 x 87.5 = **19.04**

(11) $ 2 594 x 376 = $ **975 344**
(12) $ 4 608 x 0.189 = $ **871**
(13) $ 7 832 x 897 = $ **7 025 304**
(14) $ 94 120 x 6.4 = $ **602 368**
(15) $ 8 029 x 738 = $ **5 925 402**
(16) $ 975 x45.12 = $ **43 992**
(17) $ 5 176 x 0.625 = $ **3 235**
(18) $ 3 061 x 903 = $ **2 764 083**
(19) $ 6 843 x 201 = $ **1 375 443**
(20) $ 6 549 x 643 = $ **4 211 007**

Group C

(70% accuracy 10 minutes. Calculate problems 1—10 to the nearest thousandth; 11—20 to the nearest dollar.)

(1) 937 015 / 965 = **971**
(2) 0.08988 / 6.42 = **0.014**
(3) 0.070654 / 0.136 = **0.520**
(4) 63 366/ 708 = **89.5**
(5) 55.426 / 214 = **0.259**
(6) 415 473 / 591 = **703**
(7) 315.333 / 45.9 = **6.87**
(8) 280 932 / 82 = **3 426**
(9) 17.316 / 0.037 = **468**
(10) 241 893 / 7 803 = **31**

(11) $ 99 /0.368 = $ **269**
(12) $ 83 619 / 27 = $ **3 097**
(13) $ 71 967 / 149 = $ **483**
(14) $ 649 612 /7 061 = $ **92**
(15) $ 560/ 0.875 = $ **640**
(16) $ 415 693 /593 = $ **701**
(17) $ 33 154 / 60.5 = $ **548**
(18) $ 2 485 / 2.84 = $ **875**
(19) $ 122563 /901 = $ **136**
(20) $ 54 /0.432 = $ **125**