

# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x   | 0       | δ   | 1       | δ   | 2       | δ   | 3       | δ   | 4       | δ   |
|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| 1,0 | 1,00000 | 332 | 1,00332 | 330 | 1,00662 | 328 | 1,00990 | 326 | 1,01316 | 324 |
| 1,1 | 1,03228 | 312 | 1,03540 | 310 | 1,03850 | 308 | 1,04158 | 306 | 1,04464 | 305 |
| 1,2 | 1,06266 | 294 | 1,06560 | 293 | 1,06853 | 291 | 1,07144 | 290 | 1,07434 | 288 |
| 1,3 | 1,09139 | 279 | 1,09418 | 278 | 1,09696 | 276 | 1,09972 | 275 | 1,10247 | 274 |
| 1,4 | 1,11869 | 266 | 1,12135 | 264 | 1,12399 | 263 | 1,12662 | 262 | 1,12924 | 261 |
| 1,5 | 1,14471 | 254 | 1,14725 | 253 | 1,14978 | 252 | 1,15230 | 250 | 1,15480 | 249 |
| 1,6 | 1,16961 | 243 | 1,17204 | 242 | 1,17446 | 241 | 1,17687 | 240 | 1,17927 | 240 |
| 1,7 | 1,19348 | 234 | 1,19582 | 233 | 1,19815 | 231 | 1,20046 | 231 | 1,20277 | 230 |
| 1,8 | 1,21644 | 225 | 1,21869 | 224 | 1,22093 | 223 | 1,22316 | 223 | 1,22539 | 221 |
| 1,9 | 1,23856 | 217 | 1,24073 | 216 | 1,24289 | 216 | 1,24505 | 214 | 1,24719 | 214 |
| 2,0 | 1,25992 | 210 | 1,26202 | 209 | 1,26411 | 208 | 1,26619 | 208 | 1,26827 | 206 |
| 2,1 | 1,28058 | 203 | 1,28261 | 202 | 1,28463 | 202 | 1,28665 | 201 | 1,28866 | 200 |
| 2,2 | 1,30059 | 197 | 1,30256 | 196 | 1,30452 | 196 | 1,30648 | 195 | 1,30843 | 194 |
| 2,3 | 1,32001 | 191 | 1,32192 | 190 | 1,32382 | 190 | 1,32572 | 189 | 1,32761 | 189 |
| 2,4 | 1,33887 | 185 | 1,34072 | 185 | 1,34257 | 185 | 1,34442 | 184 | 1,34626 | 184 |
| 2,5 | 1,35721 | 181 | 1,35902 | 180 | 1,36082 | 180 | 1,36262 | 179 | 1,36441 | 179 |
| 2,6 | 1,37507 | 176 | 1,37683 | 176 | 1,37859 | 175 | 1,38034 | 174 | 1,38208 | 175 |
| 2,7 | 1,39248 | 171 | 1,39419 | 172 | 1,39591 | 171 | 1,39761 | 171 | 1,39932 | 170 |
| 2,8 | 1,40946 | 168 | 1,41114 | 167 | 1,41281 | 167 | 1,41448 | 166 | 1,41614 | 166 |
| 2,9 | 1,42604 | 164 | 1,42768 | 163 | 1,42931 | 163 | 1,43094 | 163 | 1,43257 | 162 |
| 3,0 | 1,44225 | 160 | 1,44385 | 160 | 1,44545 | 159 | 1,44704 | 159 | 1,44863 | 159 |
| 3,1 | 1,45810 | 157 | 1,45967 | 156 | 1,46123 | 156 | 1,46279 | 155 | 1,46434 | 156 |
| 3,2 | 1,47361 | 154 | 1,47515 | 153 | 1,47668 | 152 | 1,47820 | 153 | 1,47973 | 152 |
| 3,3 | 1,48881 | 150 | 1,49031 | 150 | 1,49181 | 149 | 1,49330 | 150 | 1,49480 | 149 |
| 3,4 | 1,50369 | 148 | 1,50517 | 147 | 1,50664 | 146 | 1,50810 | 147 | 1,50957 | 146 |
| 3,5 | 1,51829 | 145 | 1,51974 | 144 | 1,52118 | 144 | 1,52262 | 144 | 1,52406 | 143 |
| 3,6 | 1,53262 | 142 | 1,53404 | 141 | 1,53545 | 141 | 1,53686 | 141 | 1,53827 | 141 |
| 3,7 | 1,54668 | 139 | 1,54807 | 139 | 1,54946 | 139 | 1,55085 | 138 | 1,55223 | 139 |
| 3,8 | 1,56049 | 137 | 1,56186 | 136 | 1,56322 | 137 | 1,56459 | 136 | 1,56595 | 136 |
| 3,9 | 1,57406 | 135 | 1,57541 | 134 | 1,57675 | 134 | 1,57809 | 133 | 1,57942 | 134 |
| 4,0 | 1,58740 | 132 | 1,58872 | 132 | 1,59004 | 132 | 1,59136 | 131 | 1,59267 | 132 |
| 4,1 | 1,60052 | 130 | 1,60182 | 130 | 1,60312 | 129 | 1,60441 | 130 | 1,60571 | 129 |
| 4,2 | 1,61343 | 128 | 1,61471 | 128 | 1,61599 | 127 | 1,61726 | 127 | 1,61853 | 128 |
| 4,3 | 1,62613 | 126 | 1,62739 | 126 | 1,62865 | 126 | 1,62991 | 125 | 1,63116 | 125 |
| 4,4 | 1,63864 | 124 | 1,63988 | 124 | 1,64112 | 124 | 1,64236 | 123 | 1,64359 | 124 |
| 4,5 | 1,65096 | 123 | 1,65219 | 122 | 1,65341 | 121 | 1,65462 | 122 | 1,65584 | 122 |
| 4,6 | 1,66310 | 121 | 1,66431 | 120 | 1,66551 | 120 | 1,66671 | 120 | 1,66791 | 120 |
| 4,7 | 1,67507 | 119 | 1,67626 | 118 | 1,67744 | 119 | 1,67863 | 118 | 1,67981 | 118 |
| 4,8 | 1,68687 | 117 | 1,68804 | 116 | 1,68920 | 117 | 1,69037 | 117 | 1,69154 | 116 |
| 4,9 | 1,69850 | 115 | 1,69965 | 116 | 1,70081 | 115 | 1,70196 | 115 | 1,70311 | 115 |
| 5,0 | 1,70998 | 114 | 1,71112 | 113 | 1,71225 | 114 | 1,71339 | 113 | 1,71452 | 114 |
| 5,1 | 1,72130 | 112 | 1,72242 | 113 | 1,72355 | 112 | 1,72467 | 112 | 1,72579 | 112 |
| 5,2 | 1,73248 | 111 | 1,73359 | 111 | 1,73470 | 110 | 1,73580 | 111 | 1,73691 | 110 |
| 5,3 | 1,74351 | 110 | 1,74461 | 109 | 1,74570 | 110 | 1,74680 | 109 | 1,74789 | 109 |
| 5,4 | 1,75441 | 108 | 1,75549 | 108 | 1,75657 | 108 | 1,75765 | 108 | 1,75873 | 108 |
| 5,5 | 1,76517 | 107 | 1,76624 | 107 | 1,76731 | 107 | 1,76838 | 106 | 1,76944 | 107 |
| 5,6 | 1,77581 | 105 | 1,77686 | 106 | 1,77792 | 105 | 1,77897 | 106 | 1,78003 | 105 |
| 5,7 | 1,78632 | 104 | 1,78736 | 104 | 1,78840 | 104 | 1,78944 | 104 | 1,79048 | 104 |
| 5,8 | 1,79670 | 103 | 1,79773 | 103 | 1,79876 | 103 | 1,79979 | 103 | 1,80082 | 103 |
| 5,9 | 1,80697 | 102 | 1,80799 | 102 | 1,80901 | 102 | 1,81003 | 101 | 1,81104 | 102 |

Błąd przybliżeń podanych na str. 122 i 123 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000778 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x   |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|-----|
| 1,01640 | 321      | 1,01961 | 320      | 1,02281 | 318      | 1,02599 | 315      | 1,02914 | 314      | 1,0 |
| 1,04769 | 303      | 1,05072 | 301      | 1,05373 | 299      | 1,05672 | 298      | 1,05970 | 296      | 1,1 |
| 1,07722 | 286      | 1,08008 | 285      | 1,08293 | 284      | 1,08577 | 282      | 1,08859 | 280      | 1,2 |
| 1,10521 | 272      | 1,10793 | 271      | 1,11064 | 270      | 1,11334 | 268      | 1,11602 | 267      | 1,3 |
| 1,13185 | 260      | 1,13445 | 258      | 1,13703 | 257      | 1,13960 | 256      | 1,14216 | 255      | 1,4 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,15729 | 249      | 1,15978 | 247      | 1,16225 | 246      | 1,16471 | 246      | 1,16717 | 244      | 1,5 |
| 1,18167 | 238      | 1,18405 | 237      | 1,18642 | 236      | 1,18878 | 236      | 1,19114 | 234      | 1,6 |
| 1,20507 | 229      | 1,20736 | 228      | 1,20964 | 228      | 1,21192 | 226      | 1,21418 | 226      | 1,7 |
| 1,22760 | 221      | 1,22981 | 220      | 1,23201 | 219      | 1,23420 | 219      | 1,23639 | 217      | 1,8 |
| 1,24933 | 213      | 1,25146 | 213      | 1,25359 | 212      | 1,25571 | 211      | 1,25782 | 210      | 1,9 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,27033 | 207      | 1,27240 | 205      | 1,27445 | 205      | 1,27650 | 204      | 1,27854 | 204      | 2,0 |
| 1,29066 | 200      | 1,29266 | 199      | 1,29465 | 199      | 1,29664 | 198      | 1,29862 | 197      | 2,1 |
| 1,31037 | 194      | 1,31231 | 193      | 1,31424 | 193      | 1,31617 | 192      | 1,31809 | 192      | 2,2 |
| 1,32950 | 189      | 1,33139 | 187      | 1,33326 | 188      | 1,33514 | 186      | 1,33700 | 187      | 2,3 |
| 1,34810 | 183      | 1,34993 | 183      | 1,35176 | 182      | 1,35358 | 182      | 1,35540 | 181      | 2,4 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,36620 | 178      | 1,36798 | 178      | 1,36976 | 177      | 1,37153 | 177      | 1,37330 | 177      | 2,5 |
| 1,38383 | 174      | 1,38557 | 173      | 1,38730 | 173      | 1,38903 | 173      | 1,39076 | 172      | 2,6 |
| 1,40102 | 170      | 1,40272 | 169      | 1,40441 | 169      | 1,40610 | 168      | 1,40778 | 168      | 2,7 |
| 1,41780 | 166      | 1,41946 | 165      | 1,42111 | 165      | 1,42276 | 164      | 1,42440 | 164      | 2,8 |
| 1,43419 | 162      | 1,43581 | 162      | 1,43743 | 161      | 1,43904 | 161      | 1,44065 | 160      | 2,9 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,45022 | 158      | 1,45180 | 158      | 1,45338 | 158      | 1,45496 | 157      | 1,45653 | 157      | 3,0 |
| 1,46590 | 155      | 1,46745 | 154      | 1,46899 | 155      | 1,47054 | 154      | 1,47208 | 153      | 3,1 |
| 1,48125 | 152      | 1,48277 | 151      | 1,48428 | 151      | 1,48579 | 151      | 1,48730 | 151      | 3,2 |
| 1,49629 | 148      | 1,49777 | 149      | 1,49926 | 148      | 1,50074 | 148      | 1,50222 | 147      | 3,3 |
| 1,51103 | 146      | 1,51249 | 145      | 1,51394 | 146      | 1,51540 | 145      | 1,51685 | 144      | 3,4 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,52549 | 143      | 1,52692 | 143      | 1,52835 | 143      | 1,52978 | 142      | 1,53120 | 142      | 3,5 |
| 1,53968 | 141      | 1,54109 | 140      | 1,54249 | 140      | 1,54389 | 140      | 1,54529 | 139      | 3,6 |
| 1,55362 | 138      | 1,55500 | 137      | 1,55637 | 138      | 1,55775 | 137      | 1,55912 | 137      | 3,7 |
| 1,56731 | 135      | 1,56866 | 135      | 1,57001 | 136      | 1,57137 | 134      | 1,57271 | 135      | 3,8 |
| 1,58076 | 133      | 1,58209 | 133      | 1,58342 | 133      | 1,58475 | 133      | 1,58608 | 132      | 3,9 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,59399 | 131      | 1,59530 | 131      | 1,59661 | 130      | 1,59791 | 131      | 1,59922 | 130      | 4,0 |
| 1,60700 | 129      | 1,60829 | 129      | 1,60958 | 128      | 1,61086 | 129      | 1,61215 | 128      | 4,1 |
| 1,61981 | 127      | 1,62108 | 126      | 1,62234 | 127      | 1,62361 | 126      | 1,62487 | 126      | 4,2 |
| 1,63241 | 125      | 1,63366 | 125      | 1,63491 | 125      | 1,63616 | 124      | 1,63740 | 124      | 4,3 |
| 1,64483 | 123      | 1,64606 | 123      | 1,64729 | 122      | 1,64851 | 123      | 1,64974 | 122      | 4,4 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,65706 | 121      | 1,65827 | 121      | 1,65948 | 121      | 1,66069 | 121      | 1,66190 | 120      | 4,5 |
| 1,66911 | 119      | 1,67030 | 120      | 1,67150 | 119      | 1,67269 | 119      | 1,67388 | 119      | 4,6 |
| 1,68099 | 118      | 1,68217 | 117      | 1,68334 | 118      | 1,68452 | 117      | 1,68569 | 118      | 4,7 |
| 1,69270 | 116      | 1,69386 | 117      | 1,69503 | 116      | 1,69619 | 115      | 1,69734 | 116      | 4,8 |
| 1,70426 | 114      | 1,70540 | 115      | 1,70655 | 114      | 1,70769 | 115      | 1,70884 | 114      | 4,9 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,71566 | 113      | 1,71679 | 113      | 1,71792 | 113      | 1,71905 | 112      | 1,72017 | 113      | 5,0 |
| 1,72691 | 111      | 1,72802 | 112      | 1,72914 | 111      | 1,73025 | 112      | 1,73137 | 111      | 5,1 |
| 1,73801 | 111      | 1,73912 | 110      | 1,74022 | 110      | 1,74132 | 110      | 1,74242 | 109      | 5,2 |
| 1,74898 | 109      | 1,75007 | 109      | 1,75116 | 108      | 1,75224 | 109      | 1,75333 | 108      | 5,3 |
| 1,75981 | 107      | 1,76088 | 108      | 1,76196 | 107      | 1,76303 | 107      | 1,76410 | 107      | 5,4 |
|         |          |         |          |         |          |         |          |         |          |     |
| 1,77051 | 106      | 1,77157 | 106      | 1,77263 | 106      | 1,77369 | 106      | 1,77475 | 106      | 5,5 |
| 1,78108 | 105      | 1,78213 | 105      | 1,78318 | 104      | 1,78422 | 105      | 1,78527 | 105      | 5,6 |
| 1,79152 | 104      | 1,79256 | 104      | 1,79360 | 103      | 1,79463 | 104      | 1,79567 | 103      | 5,7 |
| 1,80185 | 103      | 1,80288 | 102      | 1,80390 | 102      | 1,80492 | 103      | 1,80595 | 102      | 5,8 |
| 1,81206 | 101      | 1,81307 | 102      | 1,81409 | 101      | 1,81510 | 101      | 1,81611 | 101      | 5,9 |

$\sqrt[3]{x}$

The error of the approximations given on pp. 122 and 123 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000778 + the error of rounding off the result.

An example of interpolation is given on p. 127.

# VIII. Pierwiastki sześciennne ( $\sqrt[3]{x}$ )

| $x$  | 0       | $\delta$ | 1       | $\delta$ | 2       | $\delta$ | 3       | $\delta$ | 4       | $\delta$ |
|------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| 6,0  | 1,81712 | 101      | 1,81813 | 101      | 1,81914 | 100      | 1,82014 | 101      | 1,82115 | 100      |
| 6,1  | 1,82716 | 100      | 1,82816 | 099      | 1,82915 | 100      | 1,83015 | 100      | 1,83115 | 099      |
| 6,2  | 1,83709 | 099      | 1,83808 | 098      | 1,83906 | 099      | 1,84005 | 098      | 1,84103 | 099      |
| 6,3  | 1,84691 | 098      | 1,84789 | 098      | 1,84887 | 097      | 1,84984 | 098      | 1,85082 | 097      |
| 6,4  | 1,85664 | 096      | 1,85760 | 097      | 1,85857 | 096      | 1,85953 | 097      | 1,86050 | 096      |
| 6,5  | 1,86626 | 095      | 1,86721 | 096      | 1,86817 | 095      | 1,86912 | 096      | 1,87008 | 095      |
| 6,6  | 1,87578 | 094      | 1,87672 | 095      | 1,87767 | 095      | 1,87862 | 094      | 1,87956 | 094      |
| 6,7  | 1,88520 | 094      | 1,88614 | 094      | 1,88708 | 093      | 1,88801 | 094      | 1,88895 | 093      |
| 6,8  | 1,89454 | 092      | 1,89546 | 093      | 1,89639 | 093      | 1,89732 | 092      | 1,89824 | 093      |
| 6,9  | 1,90378 | 092      | 1,90470 | 092      | 1,90562 | 091      | 1,90653 | 092      | 1,90745 | 092      |
| 7,0  | 1,91293 | 091      | 1,91384 | 091      | 1,91475 | 091      | 1,91566 | 091      | 1,91657 | 090      |
| 7,1  | 1,92200 | 090      | 1,92290 | 090      | 1,92380 | 090      | 1,92470 | 090      | 1,92560 | 090      |
| 7,2  | 1,93098 | 089      | 1,93187 | 090      | 1,93277 | 089      | 1,93366 | 089      | 1,93455 | 089      |
| 7,3  | 1,93988 | 088      | 1,94076 | 089      | 1,94165 | 088      | 1,94253 | 088      | 1,94341 | 089      |
| 7,4  | 1,94870 | 087      | 1,94957 | 088      | 1,95045 | 087      | 1,95132 | 088      | 1,95220 | 087      |
| 7,5  | 1,95743 | 087      | 1,95830 | 087      | 1,95917 | 087      | 1,96004 | 087      | 1,96091 | 086      |
| 7,6  | 1,96610 | 086      | 1,96696 | 086      | 1,96782 | 086      | 1,96868 | 086      | 1,96954 | 086      |
| 7,7  | 1,97468 | 086      | 1,97554 | 085      | 1,97639 | 085      | 1,97724 | 085      | 1,97809 | 086      |
| 7,8  | 1,98319 | 085      | 1,98404 | 085      | 1,98489 | 084      | 1,98573 | 085      | 1,98658 | 084      |
| 7,9  | 1,99163 | 084      | 1,99247 | 084      | 1,99331 | 084      | 1,99415 | 084      | 1,99499 | 083      |
| 8,0  | 2,00000 | 083      | 2,00083 | 084      | 2,00167 | 083      | 2,00250 | 083      | 2,00333 | 083      |
| 8,1  | 2,00830 | 082      | 2,00912 | 083      | 2,00995 | 083      | 2,01078 | 082      | 2,01160 | 082      |
| 8,2  | 2,01653 | 082      | 2,01735 | 082      | 2,01817 | 082      | 2,01899 | 081      | 2,01980 | 082      |
| 8,3  | 2,02469 | 082      | 2,02551 | 081      | 2,02632 | 081      | 2,02713 | 081      | 2,02794 | 081      |
| 8,4  | 2,03279 | 081      | 2,03360 | 080      | 2,03440 | 081      | 2,03521 | 080      | 2,03601 | 081      |
| 8,5  | 2,04083 | 080      | 2,04163 | 080      | 2,04243 | 080      | 2,04323 | 079      | 2,04402 | 080      |
| 8,6  | 2,04880 | 079      | 2,04959 | 080      | 2,05039 | 079      | 2,05118 | 079      | 2,05197 | 079      |
| 8,7  | 2,05671 | 079      | 2,05750 | 078      | 2,05828 | 079      | 2,05907 | 079      | 2,05986 | 078      |
| 8,8  | 2,06456 | 078      | 2,06534 | 078      | 2,06612 | 078      | 2,06690 | 078      | 2,06768 | 078      |
| 8,9  | 2,07235 | 078      | 2,07313 | 077      | 2,07390 | 078      | 2,07468 | 077      | 2,07545 | 077      |
| 9,0  | 2,08008 | 077      | 2,08085 | 077      | 2,08162 | 077      | 2,08239 | 077      | 2,08316 | 077      |
| 9,1  | 2,08776 | 076      | 2,08852 | 077      | 2,08929 | 076      | 2,09005 | 076      | 2,09081 | 077      |
| 9,2  | 2,09538 | 076      | 2,09614 | 076      | 2,09690 | 075      | 2,09765 | 076      | 2,09841 | 076      |
| 9,3  | 2,10294 | 076      | 2,10370 | 075      | 2,10445 | 075      | 2,10520 | 075      | 2,10595 | 076      |
| 9,4  | 2,11045 | 075      | 2,11120 | 075      | 2,11195 | 075      | 2,11270 | 074      | 2,11344 | 075      |
| 9,5  | 2,11791 | 074      | 2,11865 | 075      | 2,11940 | 074      | 2,12014 | 074      | 2,12088 | 074      |
| 9,6  | 2,12532 | 073      | 2,12605 | 074      | 2,12679 | 074      | 2,12753 | 073      | 2,12826 | 074      |
| 9,7  | 2,13267 | 073      | 2,13340 | 074      | 2,13414 | 073      | 2,13487 | 073      | 2,13560 | 073      |
| 9,8  | 2,13997 | 073      | 2,14070 | 073      | 2,14143 | 073      | 2,14216 | 072      | 2,14288 | 073      |
| 9,9  | 2,14723 | 072      | 2,14795 | 072      | 2,14867 | 073      | 2,14940 | 072      | 2,15012 | 072      |
| 10,0 | 2,15443 | 072      | 2,15515 | 072      | 2,15587 | 072      | 2,15659 | 071      | 2,15730 | 072      |
| 10,1 | 2,16159 | 072      | 2,16231 | 071      | 2,16302 | 071      | 2,16373 | 071      | 2,16444 | 071      |
| 10,2 | 2,16870 | 071      | 2,16941 | 071      | 2,17012 | 071      | 2,17083 | 070      | 2,17153 | 071      |
| 10,3 | 2,17577 | 070      | 2,17647 | 070      | 2,17717 | 071      | 2,17788 | 070      | 2,17858 | 070      |
| 10,4 | 2,18279 | 070      | 2,18349 | 069      | 2,18418 | 070      | 2,18488 | 070      | 2,18558 | 070      |
| 10,5 | 2,18976 | 069      | 2,19045 | 070      | 2,19115 | 069      | 2,19184 | 070      | 2,19254 | 069      |
| 10,6 | 2,19669 | 069      | 2,19738 | 069      | 2,19807 | 069      | 2,19876 | 069      | 2,19945 | 069      |
| 10,7 | 2,20358 | 068      | 2,20426 | 069      | 2,20495 | 068      | 2,20563 | 069      | 2,20632 | 068      |
| 10,8 | 2,21042 | 068      | 2,21110 | 068      | 2,21178 | 068      | 2,21246 | 068      | 2,21314 | 068      |
| 10,9 | 2,21722 | 068      | 2,21790 | 068      | 2,21858 | 067      | 2,21925 | 068      | 2,21993 | 068      |

Błąd przybliżeń podanych na str. 124 i 125 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000515 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x    |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|------|
| 1,82215 | 101      | 1,82316 | 100      | 1,82416 | 100      | 1,82516 | 100      | 1,82616 | 100      | 6,0  |
| 1,83214 | 099      | 1,83313 | 099      | 1,83412 | 099      | 1,83511 | 099      | 1,83610 | 099      | 6,1  |
| 1,84202 | 098      | 1,84300 | 098      | 1,84398 | 098      | 1,84496 | 098      | 1,84594 | 097      | 6,2  |
| 1,85179 | 097      | 1,85276 | 097      | 1,85373 | 097      | 1,85470 | 097      | 1,85567 | 097      | 6,3  |
| 1,86146 | 096      | 1,86242 | 096      | 1,86338 | 096      | 1,86434 | 096      | 1,86530 | 096      | 6,4  |
|         |          |         |          |         |          |         |          |         |          |      |
| 1,87103 | 095      | 1,87198 | 095      | 1,87293 | 095      | 1,87388 | 095      | 1,87483 | 095      | 6,5  |
| 1,88050 | 094      | 1,88144 | 095      | 1,88239 | 094      | 1,88333 | 094      | 1,88427 | 093      | 6,6  |
| 1,88988 | 093      | 1,89081 | 094      | 1,89175 | 093      | 1,89268 | 093      | 1,89361 | 093      | 6,7  |
| 1,89917 | 092      | 1,90009 | 093      | 1,90102 | 092      | 1,90194 | 092      | 1,90286 | 092      | 6,8  |
| 1,90837 | 091      | 1,90928 | 091      | 1,91019 | 092      | 1,91111 | 091      | 1,91202 | 091      | 6,9  |
|         |          |         |          |         |          |         |          |         |          |      |
| 1,91747 | 091      | 1,91838 | 091      | 1,91929 | 090      | 1,92019 | 090      | 1,92109 | 091      | 7,0  |
| 1,92650 | 090      | 1,92740 | 089      | 1,92829 | 090      | 1,92919 | 089      | 1,93008 | 090      | 7,1  |
| 1,93544 | 089      | 1,93633 | 089      | 1,93722 | 088      | 1,93810 | 089      | 1,93899 | 089      | 7,2  |
| 1,94430 | 088      | 1,94518 | 088      | 1,94606 | 088      | 1,94694 | 088      | 1,94782 | 088      | 7,3  |
| 1,95307 | 088      | 1,95395 | 087      | 1,95482 | 087      | 1,95569 | 087      | 1,95656 | 087      | 7,4  |
|         |          |         |          |         |          |         |          |         |          |      |
| 1,96177 | 087      | 1,96264 | 086      | 1,96350 | 087      | 1,96437 | 086      | 1,96523 | 087      | 7,5  |
| 1,97040 | 086      | 1,97126 | 085      | 1,97211 | 086      | 1,97297 | 086      | 1,97383 | 085      | 7,6  |
| 1,97895 | 085      | 1,97980 | 085      | 1,98065 | 085      | 1,98150 | 084      | 1,98234 | 085      | 7,7  |
| 1,98742 | 084      | 1,98826 | 085      | 1,98911 | 084      | 1,98995 | 084      | 1,99079 | 084      | 7,8  |
| 1,99582 | 084      | 1,99666 | 084      | 1,99750 | 083      | 1,99833 | 084      | 1,99917 | 083      | 7,9  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,00416 | 083      | 2,00499 | 083      | 2,00582 | 082      | 2,00664 | 083      | 2,00747 | 083      | 8,0  |
| 2,01242 | 083      | 2,01325 | 082      | 2,01407 | 082      | 2,01489 | 082      | 2,01571 | 082      | 8,1  |
| 2,02062 | 082      | 2,02144 | 081      | 2,02225 | 082      | 2,02307 | 081      | 2,02388 | 081      | 8,2  |
| 2,02875 | 081      | 2,02956 | 081      | 2,03037 | 081      | 2,03118 | 081      | 2,03199 | 080      | 8,3  |
| 2,03682 | 080      | 2,03762 | 080      | 2,03842 | 081      | 2,03923 | 080      | 2,04003 | 080      | 8,4  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,04482 | 080      | 2,04562 | 079      | 2,04641 | 080      | 2,04721 | 080      | 2,04801 | 079      | 8,5  |
| 2,05276 | 079      | 2,05355 | 079      | 2,05434 | 079      | 2,05513 | 079      | 2,05592 | 079      | 8,6  |
| 2,06064 | 079      | 2,06143 | 078      | 2,06221 | 078      | 2,06299 | 079      | 2,06378 | 078      | 8,7  |
| 2,06846 | 078      | 2,06924 | 078      | 2,07002 | 078      | 2,07080 | 077      | 2,07157 | 078      | 8,8  |
| 2,07622 | 078      | 2,07700 | 077      | 2,07777 | 077      | 2,07854 | 077      | 2,07931 | 077      | 8,9  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,08393 | 077      | 2,08470 | 076      | 2,08546 | 077      | 2,08623 | 076      | 2,08699 | 077      | 9,0  |
| 2,09158 | 076      | 2,09234 | 076      | 2,09310 | 076      | 2,09386 | 076      | 2,09462 | 076      | 9,1  |
| 2,09917 | 075      | 2,09992 | 076      | 2,10068 | 076      | 2,10144 | 075      | 2,10219 | 075      | 9,2  |
| 2,10671 | 075      | 2,10746 | 075      | 2,10821 | 075      | 2,10896 | 075      | 2,10971 | 074      | 9,3  |
| 2,11419 | 075      | 2,11494 | 074      | 2,11568 | 074      | 2,11642 | 075      | 2,11717 | 074      | 9,4  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,12162 | 074      | 2,12236 | 074      | 2,12310 | 074      | 2,12384 | 074      | 2,12458 | 074      | 9,5  |
| 2,12900 | 074      | 2,12974 | 073      | 2,13047 | 073      | 2,13120 | 074      | 2,13194 | 073      | 9,6  |
| 2,13633 | 073      | 2,13706 | 073      | 2,13779 | 073      | 2,13852 | 073      | 2,13925 | 072      | 9,7  |
| 2,14361 | 072      | 2,14433 | 073      | 2,14506 | 072      | 2,14578 | 073      | 2,14651 | 072      | 9,8  |
| 2,15084 | 072      | 2,15156 | 072      | 2,15228 | 072      | 2,15300 | 072      | 2,15372 | 071      | 9,9  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,15802 | 071      | 2,15873 | 072      | 2,15945 | 071      | 2,16016 | 072      | 2,16088 | 071      | 10,0 |
| 2,16515 | 071      | 2,16586 | 071      | 2,16657 | 071      | 2,16728 | 071      | 2,16799 | 071      | 10,1 |
| 2,17224 | 071      | 2,17295 | 070      | 2,17365 | 071      | 2,17436 | 070      | 2,17506 | 071      | 10,2 |
| 2,17928 | 070      | 2,17998 | 070      | 2,18068 | 071      | 2,18139 | 070      | 2,18209 | 070      | 10,3 |
| 2,18628 | 070      | 2,18698 | 069      | 2,18767 | 070      | 2,18837 | 069      | 2,18906 | 070      | 10,4 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,19323 | 069      | 2,19392 | 069      | 2,19461 | 070      | 2,19531 | 069      | 2,19600 | 069      | 10,5 |
| 2,20014 | 069      | 2,20083 | 068      | 2,20151 | 069      | 2,20220 | 069      | 2,20289 | 069      | 10,6 |
| 2,20700 | 069      | 2,20769 | 068      | 2,20837 | 068      | 2,20905 | 069      | 2,20974 | 068      | 10,7 |
| 2,21382 | 068      | 2,21450 | 068      | 2,21518 | 068      | 2,21586 | 068      | 2,21654 | 068      | 10,8 |
| 2,22061 | 067      | 2,22128 | 068      | 2,22196 | 067      | 2,22263 | 068      | 2,22331 | 067      | 10,9 |

$\sqrt[3]{x}$

The error of the approximations given on pp. 124 and 125 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000515 + the error of rounding off the result.

An example of interpolation is given on p. 127.

# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x    | 0       | $\delta$ | 1       | $\delta$ | 2       | $\delta$ | 3       | $\delta$ | 4       | $\delta$ |
|------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| 11,0 | 2,22398 | 067      | 2,22465 | 068      | 2,22533 | 067      | 2,22600 | 067      | 2,22667 | 067      |
| 11,1 | 2,23070 | 067      | 2,23137 | 067      | 2,23204 | 067      | 2,23271 | 067      | 2,23338 | 066      |
| 11,2 | 2,23738 | 066      | 2,23804 | 067      | 2,23871 | 066      | 2,23937 | 067      | 2,24004 | 066      |
| 11,3 | 2,24402 | 066      | 2,24468 | 066      | 2,24534 | 066      | 2,24600 | 066      | 2,24666 | 066      |
| 11,4 | 2,25062 | 065      | 2,25127 | 066      | 2,25193 | 066      | 2,25259 | 066      | 2,25325 | 065      |
| 11,5 | 2,25718 | 065      | 2,25783 | 066      | 2,25849 | 065      | 2,25914 | 065      | 2,25979 | 066      |
| 11,6 | 2,26370 | 065      | 2,26435 | 065      | 2,26500 | 065      | 2,26565 | 065      | 2,26630 | 065      |
| 11,7 | 2,27019 | 065      | 2,27084 | 064      | 2,27148 | 065      | 2,27213 | 064      | 2,27277 | 065      |
| 11,8 | 2,27664 | 064      | 2,27728 | 064      | 2,27792 | 065      | 2,27857 | 064      | 2,27921 | 064      |
| 11,9 | 2,28305 | 064      | 2,28369 | 064      | 2,28433 | 064      | 2,28497 | 064      | 2,28561 | 063      |
| 12,0 | 2,28943 | 063      | 2,29006 | 064      | 2,29070 | 063      | 2,29133 | 064      | 2,29197 | 063      |
| 12,1 | 2,29577 | 063      | 2,29640 | 063      | 2,29703 | 064      | 2,29767 | 063      | 2,29830 | 063      |
| 12,2 | 2,30208 | 063      | 2,30271 | 062      | 2,30333 | 063      | 2,30396 | 063      | 2,30459 | 063      |
| 12,3 | 2,30835 | 063      | 2,30898 | 062      | 2,30960 | 063      | 2,31023 | 062      | 2,31085 | 062      |
| 12,4 | 2,31459 | 062      | 2,31521 | 062      | 2,31583 | 062      | 2,31645 | 063      | 2,31708 | 062      |
| 12,5 | 2,32079 | 062      | 2,32141 | 062      | 2,32203 | 062      | 2,32265 | 062      | 2,32327 | 061      |
| 12,6 | 2,32697 | 061      | 2,32758 | 062      | 2,32820 | 061      | 2,32881 | 062      | 2,32943 | 061      |
| 12,7 | 2,33311 | 061      | 2,33372 | 061      | 2,33433 | 061      | 2,33494 | 061      | 2,33555 | 061      |
| 12,8 | 2,33921 | 061      | 2,33982 | 061      | 2,34043 | 061      | 2,34104 | 061      | 2,34165 | 061      |
| 12,9 | 2,34529 | 061      | 2,34590 | 060      | 2,34650 | 061      | 2,34711 | 060      | 2,34771 | 061      |
| 13,0 | 2,35133 | 061      | 2,35194 | 060      | 2,35254 | 060      | 2,35314 | 060      | 2,35374 | 061      |
| 13,1 | 2,35735 | 060      | 2,35795 | 060      | 2,35855 | 060      | 2,35915 | 060      | 2,35975 | 059      |
| 13,2 | 2,36333 | 060      | 2,36393 | 059      | 2,36452 | 060      | 2,36512 | 060      | 2,36572 | 059      |
| 13,3 | 2,36928 | 060      | 2,36988 | 059      | 2,37047 | 059      | 2,37106 | 060      | 2,37166 | 059      |
| 13,4 | 2,37521 | 059      | 2,37580 | 059      | 2,37639 | 059      | 2,37698 | 059      | 2,37757 | 059      |
| 13,5 | 2,38110 | 059      | 2,38169 | 059      | 2,38228 | 058      | 2,38286 | 059      | 2,38345 | 059      |
| 13,6 | 2,38697 | 058      | 2,38755 | 059      | 2,38814 | 058      | 2,38872 | 058      | 2,38930 | 059      |
| 13,7 | 2,39280 | 058      | 2,39338 | 059      | 2,39397 | 058      | 2,39455 | 058      | 2,39513 | 058      |
| 13,8 | 2,39861 | 058      | 2,39919 | 058      | 2,39977 | 058      | 2,40035 | 058      | 2,40093 | 057      |
| 13,9 | 2,40439 | 058      | 2,40497 | 057      | 2,40554 | 058      | 2,40612 | 057      | 2,40669 | 058      |
| 14,  | 2,41014 | 573      | 2,41587 | 569      | 2,42156 | 568      | 2,42724 | 564      | 2,43288 | 562      |
| 15,  | 2,46621 | 547      | 2,47168 | 544      | 2,47712 | 543      | 2,48255 | 539      | 2,48794 | 538      |
| 16,  | 2,51984 | 524      | 2,52508 | 522      | 2,53030 | 519      | 2,53549 | 518      | 2,54067 | 515      |
| 17,  | 2,57128 | 503      | 2,57631 | 502      | 2,58133 | 499      | 2,58632 | 497      | 2,59129 | 496      |
| 18,  | 2,62074 | 485      | 2,62559 | 482      | 2,63041 | 481      | 2,63522 | 479      | 2,64001 | 478      |
| 19,  | 2,66840 | 467      | 2,67307 | 466      | 2,67773 | 464      | 2,68237 | 463      | 2,68700 | 461      |
| 20,  | 2,71442 | 451      | 2,71893 | 451      | 2,72344 | 448      | 2,72792 | 447      | 2,73239 | 446      |
| 21,  | 2,75892 | 438      | 2,76330 | 436      | 2,76766 | 434      | 2,77200 | 433      | 2,77633 | 432      |
| 22,  | 2,80204 | 424      | 2,80628 | 422      | 2,81050 | 422      | 2,81472 | 420      | 2,81892 | 419      |
| 23,  | 2,84387 | 411      | 2,84798 | 411      | 2,85209 | 409      | 2,85618 | 408      | 2,86026 | 407      |
| 24,  | 2,88450 | 400      | 2,88850 | 399      | 2,89249 | 398      | 2,89647 | 397      | 2,90044 | 395      |
| 25,  | 2,92402 | 389      | 2,92791 | 388      | 2,93179 | 388      | 2,93567 | 386      | 2,93953 | 385      |
| 26,  | 2,96250 | 379      | 2,96629 | 378      | 2,97007 | 378      | 2,97385 | 376      | 2,97761 | 376      |
| 27,  | 3,00000 | 370      | 3,00370 | 369      | 3,00739 | 368      | 3,01107 | 367      | 3,01474 | 367      |
| 28,  | 3,03659 | 361      | 3,04020 | 360      | 3,04380 | 360      | 3,04740 | 358      | 3,05098 | 358      |
| 29,  | 3,07232 | 352      | 3,07584 | 352      | 3,07936 | 351      | 3,08287 | 351      | 3,08638 | 349      |

Błąd przybliżeń podanych na str. 126 i 127 jest nie większy niż 0,000005. Błąd przybliżenia otrzymanego przez interpolację liniową jest dla  $11,0 < x < 14$  mniejszy niż 0,00000506 + błąd zaokrąglenia wyniku, a dla  $14 < x < 30$  mniejszy niż 0,00000620 + błąd zaokrąglenia wyniku.

Przykład. Należy obliczyć  $\sqrt[3]{12,8567}$ . W tym celu odczytujemy z tablicy, że  $\sqrt[3]{12,85} \approx 2,34226$  i  $\delta = 060$ . W tablicy poprawek odczytujemy dla  $\delta = 060$  i cyfr 6 i 7 liczby 36,0 i 42,0. Zatem  $\sqrt[3]{12,8567} \approx 2,34226 + 0,00036 + 0,000042 = 2,342662$  z błędem mniejszym niż 0,00000506, a stąd  $\sqrt[3]{12,8567} \approx 2,34266$  z błędem mniejszym niż 0,0000071. (Poprawkę do liczby  $\sqrt[3]{12,85} \approx 2,34226$  można również obliczyć mnożąc  $0,67 \cdot \delta = 0,67 \cdot 060 = 40,2$ . Mamy wtedy  $\sqrt[3]{12,8567} \approx 2,34226 + 0,000402 = 2,342662$ , jak poprzednio).



# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | $x$  |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|------|
| 2,22734 | 068      | 2,22802 | 067      | 2,22869 | 067      | 2,22936 | 067      | 2,23003 | 067      | 11,0 |
| 2,23404 | 067      | 2,23471 | 067      | 2,23538 | 067      | 2,23605 | 066      | 2,23671 | 067      | 11,1 |
| 2,24070 | 067      | 2,24137 | 066      | 2,24203 | 066      | 2,24269 | 066      | 2,24335 | 067      | 11,2 |
| 2,24732 | 066      | 2,24798 | 066      | 2,24864 | 066      | 2,24930 | 066      | 2,24996 | 066      | 11,3 |
| 2,25390 | 066      | 2,25456 | 065      | 2,25521 | 066      | 2,25587 | 065      | 2,25652 | 066      | 11,4 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,26045 | 065      | 2,26110 | 065      | 2,26175 | 065      | 2,26240 | 065      | 2,26305 | 065      | 11,5 |
| 2,26695 | 065      | 2,26760 | 065      | 2,26825 | 064      | 2,26889 | 065      | 2,26954 | 065      | 11,6 |
| 2,27342 | 064      | 2,27406 | 065      | 2,27471 | 064      | 2,27535 | 064      | 2,27599 | 065      | 11,7 |
| 2,27985 | 064      | 2,28049 | 064      | 2,28113 | 064      | 2,28177 | 064      | 2,28241 | 064      | 11,8 |
| 2,28624 | 064      | 2,28688 | 064      | 2,28752 | 064      | 2,28816 | 063      | 2,28879 | 064      | 11,9 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,29260 | 064      | 2,29324 | 063      | 2,29387 | 063      | 2,29450 | 064      | 2,29514 | 063      | 12,0 |
| 2,29893 | 063      | 2,29956 | 063      | 2,30019 | 063      | 2,30082 | 063      | 2,30145 | 063      | 12,1 |
| 2,30522 | 063      | 2,30585 | 062      | 2,30647 | 063      | 2,30710 | 062      | 2,30772 | 063      | 12,2 |
| 2,31147 | 063      | 2,31210 | 062      | 2,31272 | 062      | 2,31334 | 063      | 2,31397 | 062      | 12,3 |
| 2,31770 | 062      | 2,31832 | 062      | 2,31894 | 062      | 2,31956 | 062      | 2,32018 | 061      | 12,4 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,32388 | 062      | 2,32450 | 062      | 2,32512 | 061      | 2,32573 | 062      | 2,32635 | 062      | 12,5 |
| 2,33004 | 061      | 2,33065 | 062      | 2,33127 | 061      | 2,33188 | 061      | 2,33249 | 062      | 12,6 |
| 2,33616 | 061      | 2,33677 | 062      | 2,33739 | 061      | 2,33800 | 060      | 2,33860 | 061      | 12,7 |
| 2,34226 | 060      | 2,34286 | 061      | 2,34347 | 061      | 2,34408 | 060      | 2,34468 | 061      | 12,8 |
| 2,34832 | 060      | 2,34892 | 060      | 2,34952 | 061      | 2,35013 | 060      | 2,35073 | 060      | 12,9 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,35435 | 060      | 2,35495 | 060      | 2,35555 | 060      | 2,35615 | 060      | 2,35675 | 060      | 13,0 |
| 2,36034 | 060      | 2,36094 | 060      | 2,36154 | 060      | 2,36214 | 059      | 2,36273 | 060      | 13,1 |
| 2,36631 | 060      | 2,36691 | 059      | 2,36750 | 060      | 2,36810 | 059      | 2,36869 | 059      | 13,2 |
| 2,37225 | 059      | 2,37284 | 059      | 2,37343 | 060      | 2,37403 | 059      | 2,37462 | 059      | 13,3 |
| 2,37816 | 059      | 2,37875 | 059      | 2,37934 | 059      | 2,37993 | 058      | 2,38051 | 059      | 13,4 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,38404 | 058      | 2,38462 | 059      | 2,38521 | 059      | 2,38580 | 058      | 2,38638 | 059      | 13,5 |
| 2,38989 | 058      | 2,39047 | 058      | 2,39105 | 059      | 2,39164 | 058      | 2,39222 | 058      | 13,6 |
| 2,39571 | 058      | 2,39629 | 058      | 2,39687 | 058      | 2,39745 | 058      | 2,39803 | 058      | 13,7 |
| 2,40150 | 058      | 2,40208 | 058      | 2,40266 | 058      | 2,40324 | 057      | 2,40381 | 058      | 13,8 |
| 2,40727 | 057      | 2,40784 | 058      | 2,40842 | 057      | 2,40899 | 058      | 2,40957 | 057      | 13,9 |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,43850 | 559      | 2,44409 | 557      | 2,44966 | 554      | 2,45520 | 552      | 2,46072 | 549      | 14,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,49332 | 535      | 2,49867 | 532      | 2,50399 | 531      | 2,50930 | 528      | 2,51458 | 526      | 15,  |
| 2,54582 | 513      | 2,55095 | 512      | 2,55607 | 509      | 2,56116 | 507      | 2,56623 | 505      | 16,  |
| 2,59625 | 493      | 2,60118 | 492      | 2,60610 | 490      | 2,61100 | 488      | 2,61588 | 486      | 17,  |
| 2,64479 | 475      | 2,64954 | 474      | 2,65428 | 473      | 2,65901 | 470      | 2,66371 | 469      | 18,  |
| 2,69161 | 459      | 2,69620 | 458      | 2,70078 | 456      | 2,70534 | 455      | 2,70989 | 453      | 19,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,73685 | 444      | 2,74129 | 443      | 2,74572 | 442      | 2,75014 | 440      | 2,75454 | 438      | 20,  |
| 2,78065 | 430      | 2,78495 | 429      | 2,78924 | 428      | 2,79352 | 427      | 2,79779 | 425      | 21,  |
| 2,82311 | 417      | 2,82728 | 417      | 2,83145 | 415      | 2,83560 | 414      | 2,83974 | 413      | 22,  |
| 2,86433 | 405      | 2,86838 | 405      | 2,87243 | 403      | 2,87646 | 403      | 2,88049 | 401      | 23,  |
| 2,90439 | 395      | 2,90834 | 393      | 2,91227 | 393      | 2,91620 | 391      | 2,92011 | 391      | 24,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 2,94338 | 385      | 2,94723 | 383      | 2,95106 | 382      | 2,95488 | 381      | 2,95869 | 381      | 25,  |
| 2,98137 | 374      | 2,98511 | 374      | 2,98885 | 372      | 2,99257 | 372      | 2,99629 | 371      | 26,  |
| 3,01841 | 365      | 3,02206 | 365      | 3,02571 | 363      | 3,02934 | 363      | 3,03297 | 362      | 27,  |
| 3,05456 | 357      | 3,05813 | 356      | 3,06169 | 355      | 3,06524 | 354      | 3,06878 | 354      | 28,  |
| 3,08987 | 349      | 3,09336 | 348      | 3,09684 | 347      | 3,10031 | 347      | 3,10378 | 345      | 29,  |

$\sqrt[3]{x}$

The error of the approximations given on pp. 126 and 127 is not greater than 0,000005. The error of an approximation obtained by linear interpolation is for  $11,0 < x < 14$  less than 0,00000506 + the error of rounding off the result and for  $14 < x < 30$  less than 0,00000620 + the error of rounding off the result.

**Example.** To find  $\sqrt[3]{12,8567}$  we read in the table that  $\sqrt[3]{12,85} \approx 2,34226$  and  $\delta = 060$ . In the table of proportional parts we find for  $\delta = 060$  and the figures 6 and 7 the numbers 26,0 and 42,0. Consequently  $\sqrt[3]{12,8567} \approx 2,34226 + 0,00036 + 0,000042 = 2,342662$  with error less than 0,00000506, whence  $\sqrt[3]{12,8567} \approx 2,34266$  with error less than 0,0000071. (The correction for the number  $\sqrt[3]{12,85} \approx 2,34226$  can also be found by multiplying  $0,67 \cdot \delta = 0,67 \cdot 060 = 40,2$ . We then have  $\sqrt[3]{12,8567} \approx 2,34226 + 0,000402 = 2,342662$  as before).

# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x   | 0       | $\delta$ | 1       | $\delta$ | 2       | $\delta$ | 3       | $\delta$ | 4       | $\delta$ |
|-----|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| 30, | 3,10723 | 345      | 3,11068 | 344      | 3,11412 | 344      | 3,11756 | 342      | 3,12098 | 342      |
| 31, | 3,14138 | 337      | 3,14475 | 337      | 3,14812 | 336      | 3,15148 | 335      | 3,15483 | 335      |
| 32, | 3,17480 | 331      | 3,17811 | 329      | 3,18140 | 329      | 3,18469 | 329      | 3,18798 | 327      |
| 33, | 3,20753 | 324      | 3,21077 | 323      | 3,21400 | 322      | 3,21722 | 322      | 3,22044 | 321      |
| 34, | 3,23961 | 317      | 3,24278 | 317      | 3,24595 | 316      | 3,24911 | 316      | 3,25227 | 315      |
| 35, | 3,27107 | 311      | 3,27418 | 311      | 3,27729 | 310      | 3,28039 | 309      | 3,28348 | 309      |
| 36, | 3,30193 | 305      | 3,30498 | 305      | 3,30803 | 304      | 3,31107 | 304      | 3,31411 | 303      |
| 37, | 3,33222 | 300      | 3,33522 | 300      | 3,33822 | 298      | 3,34120 | 299      | 3,34419 | 297      |
| 38, | 3,36198 | 294      | 3,36492 | 294      | 3,36786 | 294      | 3,37080 | 293      | 3,37373 | 293      |
| 39, | 3,39121 | 290      | 3,39411 | 289      | 3,39700 | 288      | 3,39988 | 289      | 3,40277 | 287      |
| 40, | 3,41995 | 285      | 3,42280 | 284      | 3,42564 | 284      | 3,42848 | 283      | 3,43131 | 283      |
| 41, | 3,44822 | 280      | 3,45102 | 280      | 3,45382 | 279      | 3,45661 | 278      | 3,45939 | 279      |
| 42, | 3,47603 | 275      | 3,47878 | 276      | 3,48154 | 274      | 3,48428 | 275      | 3,48703 | 274      |
| 43, | 3,50340 | 271      | 3,50611 | 271      | 3,50882 | 271      | 3,51153 | 270      | 3,51423 | 269      |
| 44, | 3,53035 | 267      | 3,53302 | 267      | 3,53569 | 266      | 3,53835 | 266      | 3,54101 | 266      |
| 45, | 3,55689 | 264      | 3,55953 | 262      | 3,56215 | 263      | 3,56478 | 262      | 3,56740 | 262      |
| 46, | 3,58305 | 259      | 3,58564 | 259      | 3,58823 | 259      | 3,59082 | 258      | 3,59340 | 258      |
| 47, | 3,60883 | 255      | 3,61138 | 256      | 3,61394 | 255      | 3,61649 | 254      | 3,61903 | 255      |
| 48, | 3,63424 | 252      | 3,63676 | 252      | 3,63928 | 252      | 3,64180 | 251      | 3,64431 | 251      |
| 49, | 3,65931 | 248      | 3,66179 | 249      | 3,66428 | 248      | 3,66676 | 248      | 3,66924 | 247      |
| 50, | 3,68403 | 246      | 3,68649 | 245      | 3,68894 | 244      | 3,69138 | 245      | 3,69383 | 244      |
| 51, | 3,70843 | 242      | 3,71085 | 242      | 3,71327 | 242      | 3,71569 | 241      | 3,71810 | 241      |
| 52, | 3,73251 | 239      | 3,73490 | 239      | 3,73729 | 239      | 3,73968 | 238      | 3,74206 | 238      |
| 53, | 3,75629 | 236      | 3,75865 | 235      | 3,76100 | 236      | 3,76336 | 235      | 3,76571 | 235      |
| 54, | 3,77976 | 233      | 3,78209 | 233      | 3,78442 | 233      | 3,78675 | 232      | 3,78907 | 232      |
| 55, | 3,80295 | 231      | 3,80526 | 230      | 3,80756 | 229      | 3,80985 | 230      | 3,81215 | 229      |
| 56, | 3,82586 | 228      | 3,82814 | 227      | 3,83041 | 227      | 3,83268 | 227      | 3,83495 | 227      |
| 57, | 3,84850 | 225      | 3,85075 | 225      | 3,85300 | 224      | 3,85524 | 224      | 3,85748 | 224      |
| 58, | 3,87088 | 222      | 3,87310 | 222      | 3,87532 | 222      | 3,87754 | 221      | 3,87975 | 222      |
| 59, | 3,89300 | 219      | 3,89519 | 220      | 3,89739 | 219      | 3,89958 | 219      | 3,90177 | 219      |
| 60, | 3,91487 | 217      | 3,91704 | 217      | 3,91921 | 217      | 3,92138 | 217      | 3,92355 | 216      |
| 61, | 3,93650 | 215      | 3,93865 | 214      | 3,94079 | 215      | 3,94294 | 214      | 3,94508 | 214      |
| 62, | 3,95789 | 213      | 3,96002 | 212      | 3,96214 | 213      | 3,96427 | 211      | 3,96638 | 212      |
| 63, | 3,97906 | 210      | 3,98116 | 210      | 3,98326 | 210      | 3,98536 | 210      | 3,98746 | 210      |
| 64, | 4,00000 | 208      | 4,00208 | 208      | 4,00416 | 208      | 4,00624 | 208      | 4,00832 | 207      |
| 65, | 4,02073 | 206      | 4,02279 | 206      | 4,02485 | 205      | 4,02690 | 206      | 4,02896 | 205      |
| 66, | 4,04124 | 204      | 4,04328 | 204      | 4,04532 | 203      | 4,04735 | 204      | 4,04939 | 203      |
| 67, | 4,06155 | 202      | 4,06357 | 202      | 4,06559 | 201      | 4,06760 | 201      | 4,06961 | 202      |
| 68, | 4,08166 | 199      | 4,08365 | 200      | 4,08565 | 200      | 4,08765 | 199      | 4,08964 | 199      |
| 69, | 4,10157 | 198      | 4,10355 | 197      | 4,10552 | 198      | 4,10750 | 198      | 4,10948 | 197      |
| 70, | 4,12129 | 196      | 4,12325 | 196      | 4,12521 | 195      | 4,12716 | 196      | 4,12912 | 195      |
| 71, | 4,14082 | 194      | 4,14276 | 194      | 4,14470 | 194      | 4,14664 | 194      | 4,14858 | 194      |
| 72, | 4,16017 | 192      | 4,16209 | 193      | 4,16402 | 192      | 4,16594 | 192      | 4,16786 | 192      |
| 73, | 4,17934 | 191      | 4,18125 | 190      | 4,18315 | 191      | 4,18506 | 190      | 4,18696 | 190      |
| 74, | 4,19834 | 189      | 4,20023 | 189      | 4,20212 | 188      | 4,20400 | 189      | 4,20589 | 188      |
| 75, | 4,21716 | 188      | 4,21904 | 187      | 4,22091 | 187      | 4,22278 | 187      | 4,22465 | 186      |
| 76, | 4,23582 | 186      | 4,23768 | 186      | 4,23954 | 185      | 4,24139 | 185      | 4,24324 | 185      |
| 77, | 4,25432 | 184      | 4,25616 | 184      | 4,25800 | 184      | 4,25984 | 183      | 4,26167 | 184      |
| 78, | 4,27266 | 182      | 4,27448 | 183      | 4,27631 | 182      | 4,27813 | 182      | 4,27995 | 182      |
| 79, | 4,29084 | 181      | 4,29265 | 181      | 4,29446 | 181      | 4,29627 | 180      | 4,29807 | 180      |

Błąd przybliżeń podanych na str. 128 i 129 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000596 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x   |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|-----|
| 3,12440 | 341      | 3,12781 | 340      | 3,13121 | 340      | 3,13461 | 339      | 3,13800 | 338      | 30, |
| 3,15818 | 334      | 3,16152 | 333      | 3,16485 | 332      | 3,16817 | 332      | 3,17149 | 331      | 31, |
| 3,19125 | 327      | 3,19452 | 326      | 3,19778 | 326      | 3,20104 | 325      | 3,20429 | 324      | 32, |
| 3,22365 | 321      | 3,22686 | 320      | 3,23006 | 319      | 3,23325 | 318      | 3,23643 | 318      | 33, |
| 3,25542 | 314      | 3,25856 | 313      | 3,26169 | 313      | 3,26482 | 313      | 3,26795 | 312      | 34, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,28657 | 308      | 3,28965 | 308      | 3,29273 | 307      | 3,29580 | 307      | 3,29887 | 306      | 35, |
| 3,31714 | 303      | 3,32017 | 302      | 3,32319 | 302      | 3,32621 | 301      | 3,32922 | 300      | 36, |
| 3,34716 | 298      | 3,35014 | 296      | 3,35310 | 297      | 3,35607 | 295      | 3,35902 | 296      | 37, |
| 3,37666 | 292      | 3,37958 | 291      | 3,38249 | 291      | 3,38540 | 291      | 3,38831 | 290      | 38, |
| 3,40564 | 287      | 3,40851 | 287      | 3,41138 | 286      | 3,41424 | 286      | 3,41710 | 285      | 39, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,43414 | 283      | 3,43697 | 282      | 3,43979 | 281      | 3,44260 | 281      | 3,44541 | 281      | 40, |
| 3,46218 | 278      | 3,46496 | 277      | 3,46773 | 277      | 3,47050 | 277      | 3,47327 | 276      | 41, |
| 3,48977 | 273      | 3,49250 | 273      | 3,49523 | 273      | 3,49796 | 272      | 3,50068 | 272      | 42, |
| 3,51692 | 270      | 3,51962 | 269      | 3,52231 | 268      | 3,52499 | 268      | 3,52767 | 268      | 43, |
| 3,54367 | 265      | 3,54632 | 265      | 3,54897 | 265      | 3,55162 | 264      | 3,55426 | 263      | 44, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,57002 | 261      | 3,57263 | 261      | 3,57524 | 261      | 3,57785 | 260      | 3,58045 | 260      | 45, |
| 3,59598 | 258      | 3,59856 | 257      | 3,60113 | 257      | 3,60370 | 256      | 3,60626 | 257      | 46, |
| 3,62158 | 254      | 3,62412 | 253      | 3,62665 | 254      | 3,62919 | 253      | 3,63172 | 252      | 47, |
| 3,64682 | 250      | 3,64932 | 250      | 3,65182 | 250      | 3,65432 | 249      | 3,65681 | 250      | 48, |
| 3,67171 | 247      | 3,67418 | 247      | 3,67665 | 246      | 3,67911 | 246      | 3,68157 | 246      | 49, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,69627 | 244      | 3,69871 | 243      | 3,70114 | 244      | 3,70358 | 242      | 3,70600 | 243      | 50, |
| 3,72051 | 241      | 3,72292 | 240      | 3,72532 | 240      | 3,72772 | 240      | 3,73012 | 239      | 51, |
| 3,74444 | 237      | 3,74681 | 238      | 3,74919 | 236      | 3,75155 | 237      | 3,75392 | 237      | 52, |
| 3,76806 | 235      | 3,77041 | 234      | 3,77275 | 234      | 3,77509 | 234      | 3,77743 | 233      | 53, |
| 3,79139 | 232      | 3,79371 | 232      | 3,79603 | 231      | 3,79834 | 231      | 3,80065 | 230      | 54, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,81444 | 229      | 3,81673 | 229      | 3,81902 | 228      | 3,82130 | 228      | 3,82358 | 228      | 55, |
| 3,83722 | 226      | 3,83948 | 226      | 3,84174 | 225      | 3,84399 | 226      | 3,84625 | 225      | 56, |
| 3,85972 | 224      | 3,86196 | 223      | 3,86419 | 223      | 3,86642 | 223      | 3,86865 | 223      | 57, |
| 3,88197 | 221      | 3,88418 | 221      | 3,88639 | 220      | 3,88859 | 221      | 3,89080 | 220      | 58, |
| 3,90396 | 219      | 3,90615 | 218      | 3,90833 | 218      | 3,91051 | 218      | 3,91269 | 218      | 59, |
|         |          |         |          |         |          |         |          |         |          |     |
| 3,92571 | 216      | 3,92787 | 216      | 3,93003 | 216      | 3,93219 | 215      | 3,93434 | 216      | 60, |
| 3,94722 | 214      | 3,94936 | 214      | 3,95150 | 213      | 3,95363 | 213      | 3,95576 | 213      | 61, |
| 3,96850 | 212      | 3,97062 | 211      | 3,97273 | 211      | 3,97484 | 211      | 3,97695 | 211      | 62, |
| 3,98956 | 209      | 3,99165 | 209      | 3,99374 | 209      | 3,99583 | 209      | 3,99792 | 208      | 63, |
| 4,01039 | 207      | 4,01246 | 207      | 4,01453 | 207      | 4,01660 | 206      | 4,01866 | 207      | 64, |
|         |          |         |          |         |          |         |          |         |          |     |
| 4,03101 | 205      | 4,03306 | 205      | 4,03511 | 204      | 4,03715 | 205      | 4,03920 | 204      | 65, |
| 4,05142 | 203      | 4,05345 | 203      | 4,05548 | 202      | 4,05750 | 203      | 4,05953 | 202      | 66, |
| 4,07163 | 201      | 4,07364 | 200      | 4,07564 | 201      | 4,07765 | 200      | 4,07965 | 201      | 67, |
| 4,09163 | 199      | 4,09362 | 199      | 4,09561 | 199      | 4,09760 | 198      | 4,09958 | 199      | 68, |
| 4,11145 | 197      | 4,11342 | 197      | 4,11539 | 197      | 4,11736 | 196      | 4,11932 | 197      | 69, |
|         |          |         |          |         |          |         |          |         |          |     |
| 4,13107 | 196      | 4,13303 | 195      | 4,13498 | 195      | 4,13693 | 194      | 4,13887 | 195      | 70, |
| 4,15052 | 193      | 4,15245 | 193      | 4,15438 | 193      | 4,15631 | 193      | 4,15824 | 193      | 71, |
| 4,16978 | 191      | 4,17169 | 192      | 4,17361 | 191      | 4,17552 | 191      | 4,17743 | 191      | 72, |
| 4,18886 | 190      | 4,19076 | 190      | 4,19266 | 189      | 4,19455 | 189      | 4,19644 | 190      | 73, |
| 4,20777 | 188      | 4,20965 | 188      | 4,21153 | 188      | 4,21341 | 188      | 4,21529 | 187      | 74, |
|         |          |         |          |         |          |         |          |         |          |     |
| 4,22651 | 187      | 4,22838 | 186      | 4,23024 | 186      | 4,23210 | 186      | 4,23396 | 186      | 75, |
| 4,24509 | 185      | 4,24694 | 185      | 4,24879 | 184      | 4,25063 | 185      | 4,25248 | 184      | 76, |
| 4,26351 | 183      | 4,26534 | 183      | 4,26717 | 183      | 4,26900 | 183      | 4,27083 | 183      | 77, |
| 4,28177 | 182      | 4,28359 | 181      | 4,28540 | 182      | 4,28722 | 181      | 4,28903 | 181      | 78, |
| 4,29987 | 181      | 4,30168 | 180      | 4,30348 | 180      | 4,30528 | 179      | 4,30707 | 180      | 79, |

$\sqrt[3]{x}$

The error of the approximations given on pp. 128 and 129 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000596 + the error of rounding off the result.

An example of interpolation is given on p. 127.



# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x    | 0       | δ   | 1       | δ   | 2       | δ   | 3       | δ   | 4       | δ   |
|------|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| 80,  | 4,30887 | 179 | 4,31066 | 180 | 4,31246 | 179 | 4,31425 | 179 | 4,31604 | 179 |
| 81,  | 4,32675 | 178 | 4,32853 | 178 | 4,33031 | 177 | 4,33208 | 178 | 4,33386 | 177 |
| 82,  | 4,34448 | 177 | 4,34625 | 176 | 4,34801 | 176 | 4,34977 | 176 | 4,35153 | 176 |
| 83,  | 4,36207 | 175 | 4,36382 | 175 | 4,36557 | 175 | 4,36732 | 175 | 4,36907 | 174 |
| 84,  | 4,37952 | 174 | 4,38126 | 173 | 4,38299 | 174 | 4,38473 | 173 | 4,38646 | 173 |
| 85,  | 4,39683 | 172 | 4,39855 | 173 | 4,40028 | 172 | 4,40200 | 172 | 4,40372 | 171 |
| 86,  | 4,41400 | 172 | 4,41572 | 170 | 4,41742 | 171 | 4,41913 | 171 | 4,42084 | 170 |
| 87,  | 4,43105 | 169 | 4,43274 | 170 | 4,43444 | 169 | 4,43613 | 170 | 4,43783 | 169 |
| 88,  | 4,44796 | 168 | 4,44964 | 169 | 4,45133 | 168 | 4,45301 | 168 | 4,45469 | 168 |
| 89,  | 4,46475 | 167 | 4,46642 | 167 | 4,46809 | 167 | 4,46976 | 166 | 4,47142 | 167 |
| 90,  | 4,48140 | 166 | 4,48306 | 166 | 4,48472 | 166 | 4,48638 | 165 | 4,48803 | 166 |
| 91,  | 4,49794 | 165 | 4,49959 | 164 | 4,50123 | 165 | 4,50288 | 164 | 4,50452 | 164 |
| 92,  | 4,51436 | 163 | 4,51599 | 164 | 4,51763 | 163 | 4,51926 | 163 | 4,52089 | 163 |
| 93,  | 4,53065 | 163 | 4,53228 | 162 | 4,53390 | 162 | 4,53552 | 162 | 4,53714 | 162 |
| 94,  | 4,54684 | 161 | 4,54845 | 161 | 4,55006 | 161 | 4,55167 | 161 | 4,55328 | 160 |
| 95,  | 4,56290 | 160 | 4,56450 | 160 | 4,56610 | 160 | 4,56770 | 160 | 4,56930 | 159 |
| 96,  | 4,57886 | 159 | 4,58045 | 158 | 4,58203 | 159 | 4,58362 | 159 | 4,58521 | 158 |
| 97,  | 4,59470 | 158 | 4,59628 | 158 | 4,59786 | 157 | 4,59943 | 158 | 4,60101 | 157 |
| 98,  | 4,61044 | 156 | 4,61200 | 157 | 4,61357 | 157 | 4,61514 | 156 | 4,61670 | 156 |
| 99,  | 4,62607 | 155 | 4,62762 | 156 | 4,62918 | 155 | 4,63073 | 156 | 4,63229 | 155 |
| 100, | 4,64159 | 155 | 4,64314 | 154 | 4,64468 | 155 | 4,64623 | 154 | 4,64777 | 154 |
| 101, | 4,65701 | 154 | 4,65855 | 153 | 4,66008 | 154 | 4,66162 | 153 | 4,66315 | 153 |
| 102, | 4,67233 | 153 | 4,67386 | 152 | 4,67538 | 152 | 4,67690 | 153 | 4,67843 | 152 |
| 103, | 4,68755 | 151 | 4,68906 | 152 | 4,69058 | 151 | 4,69209 | 152 | 4,69361 | 151 |
| 104, | 4,70267 | 151 | 4,70418 | 150 | 4,70568 | 151 | 4,70719 | 150 | 4,70869 | 150 |
| 105, | 4,71769 | 150 | 4,71919 | 150 | 4,72069 | 149 | 4,72218 | 150 | 4,72368 | 149 |
| 106, | 4,73262 | 149 | 4,73411 | 149 | 4,73560 | 148 | 4,73708 | 149 | 4,73857 | 148 |
| 107, | 4,74746 | 148 | 4,74894 | 148 | 4,75042 | 147 | 4,75189 | 148 | 4,75337 | 147 |
| 108, | 4,76220 | 147 | 4,76367 | 147 | 4,76514 | 147 | 4,76661 | 147 | 4,76808 | 146 |
| 109, | 4,77686 | 146 | 4,77832 | 146 | 4,77978 | 145 | 4,78123 | 146 | 4,78269 | 146 |
| 110, | 4,79142 | 145 | 4,79287 | 145 | 4,79432 | 145 | 4,79577 | 145 | 4,79722 | 145 |
| 111, | 4,80590 | 144 | 4,80734 | 144 | 4,80878 | 144 | 4,81022 | 144 | 4,81166 | 144 |
| 112, | 4,82028 | 144 | 4,82172 | 143 | 4,82315 | 143 | 4,82458 | 144 | 4,82602 | 143 |
| 113, | 4,83459 | 142 | 4,83601 | 143 | 4,83744 | 142 | 4,83886 | 143 | 4,84029 | 142 |
| 114, | 4,84881 | 141 | 4,85022 | 142 | 4,85164 | 142 | 4,85306 | 141 | 4,85447 | 142 |
| 115, | 4,86294 | 141 | 4,86435 | 141 | 4,86576 | 141 | 4,86717 | 141 | 4,86858 | 140 |
| 116, | 4,87700 | 140 | 4,87840 | 140 | 4,87980 | 140 | 4,88120 | 140 | 4,88260 | 140 |
| 117, | 4,89097 | 140 | 4,89237 | 139 | 4,89376 | 139 | 4,89515 | 139 | 4,89654 | 139 |
| 118, | 4,90487 | 138 | 4,90625 | 139 | 4,90764 | 138 | 4,90902 | 138 | 4,91040 | 139 |
| 119, | 4,91868 | 138 | 4,92006 | 138 | 4,92144 | 137 | 4,92281 | 138 | 4,92419 | 137 |
| 120, | 4,93242 | 137 | 4,93379 | 137 | 4,93516 | 137 | 4,93653 | 137 | 4,93790 | 137 |
| 121, | 4,94609 | 136 | 4,94745 | 136 | 4,94881 | 136 | 4,95017 | 136 | 4,95153 | 136 |
| 122, | 4,95968 | 135 | 4,96103 | 135 | 4,96238 | 136 | 4,96374 | 135 | 4,96509 | 135 |
| 123, | 4,97319 | 135 | 4,97454 | 134 | 4,97588 | 135 | 4,97723 | 134 | 4,97857 | 135 |
| 124, | 4,98663 | 134 | 4,98797 | 134 | 4,98931 | 134 | 4,99065 | 134 | 4,99199 | 133 |
| 125, | 5,00000 | 133 | 5,00133 | 134 | 5,00267 | 133 | 5,00400 | 133 | 5,00533 | 133 |
| 126, | 5,01330 | 132 | 5,01462 | 133 | 5,01595 | 132 | 5,01727 | 133 | 5,01860 | 132 |
| 127, | 5,02653 | 131 | 5,02784 | 132 | 5,02916 | 132 | 5,03048 | 132 | 5,03180 | 131 |
| 128, | 5,03968 | 132 | 5,04100 | 131 | 5,04231 | 131 | 5,04362 | 131 | 5,04493 | 131 |
| 129, | 5,05277 | 131 | 5,05408 | 130 | 5,05538 | 131 | 5,05669 | 130 | 5,05799 | 130 |

Błąd przybliżeń podanych na str. 130 i 131 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000519 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x    |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|------|
| 4,31783 | 178      | 4,31961 | 179      | 4,32140 | 178      | 4,32318 | 179      | 4,32497 | 178      | 80,  |
| 4,33563 | 178      | 4,33741 | 177      | 4,33918 | 177      | 4,34095 | 176      | 4,34271 | 177      | 81,  |
| 4,35329 | 176      | 4,35505 | 176      | 4,35681 | 175      | 4,35856 | 176      | 4,36032 | 175      | 82,  |
| 4,37081 | 175      | 4,37256 | 174      | 4,37430 | 174      | 4,37604 | 174      | 4,37778 | 174      | 83,  |
| 4,38819 | 173      | 4,38992 | 173      | 4,39165 | 173      | 4,39338 | 172      | 4,39510 | 173      | 84,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,40543 | 172      | 4,40715 | 172      | 4,40887 | 171      | 4,41058 | 171      | 4,41229 | 171      | 85,  |
| 4,42254 | 171      | 4,42425 | 170      | 4,42595 | 170      | 4,42765 | 170      | 4,42935 | 170      | 86,  |
| 4,43952 | 169      | 4,44121 | 169      | 4,44290 | 169      | 4,44459 | 168      | 4,44627 | 169      | 87,  |
| 4,45637 | 168      | 4,45805 | 167      | 4,45972 | 168      | 4,46140 | 167      | 4,46307 | 168      | 88,  |
| 4,47309 | 167      | 4,47476 | 166      | 4,47642 | 166      | 4,47808 | 166      | 4,47974 | 166      | 89,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,48969 | 165      | 4,49134 | 165      | 4,49299 | 165      | 4,49464 | 165      | 4,49629 | 165      | 90,  |
| 4,50616 | 165      | 4,50781 | 164      | 4,50945 | 163      | 4,51108 | 164      | 4,51272 | 164      | 91,  |
| 4,52252 | 163      | 4,52415 | 163      | 4,52578 | 162      | 4,52740 | 163      | 4,52903 | 162      | 92,  |
| 4,53876 | 162      | 4,54038 | 161      | 4,54199 | 162      | 4,54361 | 161      | 4,54522 | 162      | 93,  |
| 4,55488 | 161      | 4,55649 | 160      | 4,55809 | 161      | 4,55970 | 160      | 4,56130 | 160      | 94,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,57089 | 160      | 4,57249 | 159      | 4,57408 | 159      | 4,57567 | 160      | 4,57727 | 159      | 95,  |
| 4,58679 | 159      | 4,58838 | 158      | 4,58996 | 158      | 4,59154 | 158      | 4,59312 | 158      | 96,  |
| 4,60258 | 158      | 4,60416 | 157      | 4,60573 | 157      | 4,60730 | 157      | 4,60887 | 157      | 97,  |
| 4,61826 | 157      | 4,61983 | 156      | 4,62139 | 156      | 4,62295 | 156      | 4,62451 | 156      | 98,  |
| 4,63384 | 155      | 4,63539 | 155      | 4,63694 | 155      | 4,63849 | 155      | 4,64004 | 155      | 99,  |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,64931 | 154      | 4,65085 | 154      | 4,65239 | 154      | 4,65393 | 154      | 4,65547 | 154      | 100, |
| 4,66468 | 153      | 4,66621 | 153      | 4,66774 | 153      | 4,66927 | 153      | 4,67080 | 153      | 101, |
| 4,67995 | 152      | 4,68147 | 152      | 4,68299 | 152      | 4,68451 | 152      | 4,68603 | 152      | 102, |
| 4,69512 | 151      | 4,69663 | 151      | 4,69814 | 151      | 4,69965 | 151      | 4,70116 | 151      | 103, |
| 4,71019 | 151      | 4,71170 | 150      | 4,71320 | 150      | 4,71470 | 150      | 4,71620 | 149      | 104, |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,72517 | 149      | 4,72666 | 149      | 4,72815 | 150      | 4,72965 | 148      | 4,73113 | 149      | 105, |
| 4,74005 | 149      | 4,74154 | 148      | 4,74302 | 148      | 4,74450 | 148      | 4,74598 | 148      | 106, |
| 4,75484 | 148      | 4,75632 | 147      | 4,75779 | 147      | 4,75926 | 147      | 4,76073 | 147      | 107, |
| 4,76954 | 147      | 4,77101 | 146      | 4,77247 | 146      | 4,77393 | 146      | 4,77539 | 147      | 108, |
| 4,78415 | 146      | 4,78561 | 145      | 4,78706 | 145      | 4,78851 | 146      | 4,78997 | 145      | 109, |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,79867 | 145      | 4,80012 | 144      | 4,80156 | 145      | 4,80301 | 144      | 4,80445 | 145      | 110, |
| 4,81310 | 144      | 4,81454 | 144      | 4,81598 | 143      | 4,81741 | 144      | 4,81885 | 143      | 111, |
| 4,82745 | 143      | 4,82888 | 143      | 4,83031 | 142      | 4,83173 | 143      | 4,83316 | 143      | 112, |
| 4,84171 | 142      | 4,84313 | 142      | 4,84455 | 142      | 4,84597 | 142      | 4,84739 | 142      | 113, |
| 4,85589 | 141      | 4,85730 | 141      | 4,85871 | 141      | 4,86012 | 141      | 4,86153 | 141      | 114, |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,86998 | 141      | 4,87139 | 140      | 4,87279 | 140      | 4,87419 | 141      | 4,87560 | 140      | 115, |
| 4,88400 | 139      | 4,88539 | 140      | 4,88679 | 139      | 4,88818 | 140      | 4,88958 | 139      | 116, |
| 4,89793 | 139      | 4,89932 | 139      | 4,90071 | 139      | 4,90210 | 138      | 4,90348 | 139      | 117, |
| 4,91179 | 138      | 4,91317 | 138      | 4,91455 | 138      | 4,91593 | 138      | 4,91731 | 137      | 118, |
| 4,92556 | 138      | 4,92694 | 137      | 4,92831 | 137      | 4,92968 | 137      | 4,93105 | 137      | 119, |
|         |          |         |          |         |          |         |          |         |          |      |
| 4,93927 | 136      | 4,94063 | 137      | 4,94200 | 136      | 4,94336 | 136      | 4,94472 | 137      | 120, |
| 4,95289 | 136      | 4,95425 | 136      | 4,95561 | 135      | 4,95696 | 136      | 4,95832 | 136      | 121, |
| 4,96644 | 135      | 4,96779 | 135      | 4,96914 | 135      | 4,97049 | 135      | 4,97184 | 135      | 122, |
| 4,97992 | 134      | 4,98126 | 135      | 4,98261 | 134      | 4,98395 | 134      | 4,98529 | 134      | 123, |
| 4,99332 | 134      | 4,99466 | 134      | 4,99600 | 133      | 4,99733 | 134      | 4,99867 | 133      | 124, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,00666 | 133      | 5,00799 | 133      | 5,00932 | 132      | 5,01064 | 133      | 5,01197 | 133      | 125, |
| 5,01992 | 132      | 5,02124 | 132      | 5,02256 | 133      | 5,02389 | 132      | 5,02521 | 132      | 126, |
| 5,03311 | 132      | 5,03443 | 131      | 5,03574 | 132      | 5,03706 | 131      | 5,03837 | 131      | 127, |
| 5,04624 | 131      | 5,04755 | 130      | 5,04885 | 131      | 5,05016 | 131      | 5,05147 | 130      | 128, |
| 5,05929 | 131      | 5,06060 | 130      | 5,06190 | 130      | 5,06320 | 130      | 5,06450 | 130      | 129, |

$\sqrt[3]{x}$

The error of the approximations given on pp. 130 and 131 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000519 + the error of rounding off the result.

An example of interpolation is given on p. 127.

# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x    | 0       | $\delta$ | 1       | $\delta$ | 2       | $\delta$ | 3       | $\delta$ | 4       | $\delta$ |
|------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| 130, | 5,06580 | 130      | 5,06710 | 129      | 5,06839 | 130      | 5,06969 | 130      | 5,07099 | 129      |
| 131, | 5,07875 | 130      | 5,08005 | 129      | 5,08134 | 129      | 5,08263 | 129      | 5,08392 | 129      |
| 132, | 5,09164 | 129      | 5,09293 | 128      | 5,09421 | 129      | 5,09550 | 128      | 5,09678 | 128      |
| 133, | 5,10447 | 128      | 5,10575 | 128      | 5,10703 | 127      | 5,10830 | 128      | 5,10958 | 128      |
| 134, | 5,11723 | 127      | 5,11850 | 127      | 5,11977 | 128      | 5,12105 | 127      | 5,12232 | 127      |
|      |         |          |         |          |         |          |         |          |         |          |
| 135, | 5,12993 | 126      | 5,13119 | 127      | 5,13246 | 126      | 5,13372 | 127      | 5,13499 | 126      |
| 136, | 5,14256 | 126      | 5,14382 | 126      | 5,14508 | 126      | 5,14634 | 126      | 5,14760 | 126      |
| 137, | 5,15514 | 125      | 5,15639 | 125      | 5,15764 | 126      | 5,15890 | 125      | 5,16015 | 125      |
| 138, | 5,16765 | 125      | 5,16890 | 124      | 5,17014 | 125      | 5,17139 | 125      | 5,17264 | 124      |
| 139, | 5,18010 | 124      | 5,18134 | 124      | 5,18258 | 125      | 5,18383 | 124      | 5,18507 | 124      |
|      |         |          |         |          |         |          |         |          |         |          |
| 140, | 5,19249 | 124      | 5,19373 | 124      | 5,19497 | 123      | 5,19620 | 123      | 5,19743 | 124      |
| 141, | 5,20483 | 123      | 5,20606 | 123      | 5,20729 | 123      | 5,20852 | 123      | 5,20975 | 122      |
| 142, | 5,21710 | 123      | 5,21833 | 122      | 5,21955 | 122      | 5,22077 | 123      | 5,22200 | 122      |
| 143, | 5,22932 | 122      | 5,23054 | 122      | 5,23176 | 122      | 5,23298 | 121      | 5,23419 | 122      |
| 144, | 5,24148 | 122      | 5,24270 | 121      | 5,24391 | 121      | 5,24512 | 121      | 5,24633 | 121      |
|      |         |          |         |          |         |          |         |          |         |          |
| 145, | 5,25359 | 121      | 5,25480 | 120      | 5,25600 | 121      | 5,25721 | 120      | 5,25841 | 121      |
| 146, | 5,26564 | 120      | 5,26684 | 120      | 5,26804 | 120      | 5,26924 | 120      | 5,27044 | 120      |
| 147, | 5,27763 | 120      | 5,27883 | 119      | 5,28002 | 120      | 5,28122 | 119      | 5,28241 | 120      |
| 148, | 5,28957 | 119      | 5,29076 | 119      | 5,29195 | 119      | 5,29314 | 119      | 5,29433 | 119      |
| 149, | 5,30146 | 118      | 5,30264 | 119      | 5,30383 | 118      | 5,30501 | 119      | 5,30620 | 118      |
|      |         |          |         |          |         |          |         |          |         |          |
| 150, | 5,31329 | 118      | 5,31447 | 118      | 5,31565 | 118      | 5,31683 | 118      | 5,31801 | 118      |
| 151, | 5,32507 | 118      | 5,32625 | 117      | 5,32742 | 118      | 5,32860 | 117      | 5,32977 | 118      |
| 152, | 5,33680 | 117      | 5,33797 | 117      | 5,33914 | 117      | 5,34031 | 117      | 5,34148 | 117      |
| 153, | 5,34848 | 117      | 5,34965 | 116      | 5,35081 | 116      | 5,35197 | 117      | 5,35314 | 116      |
| 154, | 5,36011 | 116      | 5,36127 | 116      | 5,36243 | 116      | 5,36359 | 116      | 5,36475 | 115      |
|      |         |          |         |          |         |          |         |          |         |          |
| 155, | 5,37169 | 115      | 5,37284 | 115      | 5,37399 | 116      | 5,37515 | 115      | 5,37630 | 116      |
| 156, | 5,38321 | 115      | 5,38436 | 115      | 5,38551 | 115      | 5,38666 | 115      | 5,38781 | 115      |
| 157, | 5,39469 | 115      | 5,39584 | 114      | 5,39698 | 114      | 5,39812 | 115      | 5,39927 | 114      |
| 158, | 5,40612 | 114      | 5,40726 | 114      | 5,40840 | 114      | 5,40954 | 114      | 5,41068 | 114      |
| 159, | 5,41750 | 114      | 5,41864 | 113      | 5,41977 | 114      | 5,42091 | 113      | 5,42204 | 113      |
|      |         |          |         |          |         |          |         |          |         |          |
| 160, | 5,42884 | 113      | 5,42997 | 113      | 5,43110 | 113      | 5,43223 | 113      | 5,43336 | 112      |
| 161, | 5,44012 | 113      | 5,44125 | 112      | 5,44237 | 113      | 5,44350 | 112      | 5,44462 | 113      |
| 162, | 5,45136 | 112      | 5,45248 | 112      | 5,45360 | 112      | 5,45472 | 112      | 5,45584 | 112      |
| 163, | 5,46256 | 111      | 5,46367 | 112      | 5,46479 | 111      | 5,46590 | 112      | 5,46702 | 112      |
| 164, | 5,47370 | 112      | 5,47482 | 111      | 5,47593 | 111      | 5,47704 | 111      | 5,47815 | 111      |
|      |         |          |         |          |         |          |         |          |         |          |
| 165, | 5,48481 | 110      | 5,48591 | 111      | 5,48702 | 111      | 5,48813 | 111      | 5,48924 | 110      |
| 166, | 5,49586 | 111      | 5,49697 | 110      | 5,49807 | 110      | 5,49917 | 111      | 5,50028 | 110      |
| 167, | 5,50688 | 110      | 5,50798 | 110      | 5,50908 | 109      | 5,51017 | 110      | 5,51127 | 110      |
| 168, | 5,51785 | 109      | 5,51894 | 110      | 5,52004 | 109      | 5,52113 | 109      | 5,52222 | 110      |
| 169, | 5,52877 | 110      | 5,52987 | 108      | 5,53095 | 109      | 5,53204 | 109      | 5,53313 | 109      |
|      |         |          |         |          |         |          |         |          |         |          |
| 170, | 5,53966 | 108      | 5,54074 | 109      | 5,54183 | 108      | 5,54291 | 109      | 5,54400 | 108      |
| 171, | 5,55050 | 108      | 5,55158 | 108      | 5,55266 | 108      | 5,55374 | 108      | 5,55482 | 108      |
| 172, | 5,56130 | 108      | 5,56238 | 107      | 5,56345 | 108      | 5,56453 | 108      | 5,56561 | 107      |
| 173, | 5,57205 | 108      | 5,57313 | 107      | 5,57420 | 107      | 5,57527 | 108      | 5,57635 | 107      |
| 174, | 5,58277 | 107      | 5,58384 | 107      | 5,58491 | 107      | 5,58598 | 106      | 5,58704 | 107      |
|      |         |          |         |          |         |          |         |          |         |          |
| 175, | 5,59344 | 107      | 5,59451 | 106      | 5,59557 | 107      | 5,59664 | 106      | 5,59770 | 107      |
| 176, | 5,60408 | 106      | 5,60514 | 106      | 5,60620 | 106      | 5,60726 | 106      | 5,60832 | 106      |
| 177, | 5,61467 | 106      | 5,61573 | 106      | 5,61679 | 105      | 5,61784 | 106      | 5,61890 | 105      |
| 178, | 5,62523 | 105      | 5,62628 | 105      | 5,62733 | 105      | 5,62838 | 106      | 5,62944 | 105      |
| 179, | 5,63574 | 105      | 5,63679 | 105      | 5,63784 | 105      | 5,63889 | 105      | 5,63994 | 104      |

Błąd przybliżeń podanych na str. 132 i 133 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000509 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x    |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|------|
| 5,07228 | 130      | 5,07358 | 129      | 5,07487 | 130      | 5,07617 | 129      | 5,07746 | 129      | 130, |
| 5,08521 | 129      | 5,08650 | 128      | 5,08778 | 129      | 5,08907 | 129      | 5,09036 | 128      | 131, |
| 5,09806 | 129      | 5,09935 | 128      | 5,10063 | 128      | 5,10191 | 128      | 5,10319 | 128      | 132, |
| 5,11086 | 127      | 5,11213 | 128      | 5,11341 | 127      | 5,11468 | 128      | 5,11596 | 127      | 133, |
| 5,12359 | 127      | 5,12486 | 127      | 5,12613 | 126      | 5,12739 | 127      | 5,12866 | 127      | 134, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,13625 | 127      | 5,13752 | 126      | 5,13878 | 126      | 5,14004 | 126      | 5,14130 | 126      | 135, |
| 5,14886 | 125      | 5,15011 | 126      | 5,15137 | 126      | 5,15263 | 125      | 5,15388 | 126      | 136, |
| 5,16140 | 125      | 5,16265 | 125      | 5,16390 | 125      | 5,16515 | 125      | 5,16640 | 125      | 137, |
| 5,17388 | 125      | 5,17513 | 124      | 5,17637 | 125      | 5,17762 | 124      | 5,17886 | 124      | 138, |
| 5,18631 | 123      | 5,18754 | 124      | 5,18878 | 124      | 5,19002 | 124      | 5,19126 | 123      | 139, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,19867 | 123      | 5,19990 | 123      | 5,20113 | 124      | 5,20237 | 123      | 5,20360 | 123      | 140, |
| 5,21097 | 123      | 5,21220 | 123      | 5,21343 | 122      | 5,21465 | 123      | 5,21588 | 122      | 141, |
| 5,22322 | 122      | 5,22444 | 122      | 5,22566 | 122      | 5,22688 | 122      | 5,22810 | 122      | 142, |
| 5,23541 | 122      | 5,23663 | 121      | 5,23784 | 122      | 5,23906 | 121      | 5,24027 | 121      | 143, |
| 5,24754 | 121      | 5,24875 | 121      | 5,24996 | 121      | 5,25117 | 121      | 5,25238 | 121      | 144, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,25962 | 120      | 5,26082 | 121      | 5,26203 | 120      | 5,26323 | 120      | 5,26443 | 121      | 145, |
| 5,27164 | 120      | 5,27284 | 120      | 5,27404 | 120      | 5,27524 | 120      | 5,27644 | 119      | 146, |
| 5,28361 | 119      | 5,28480 | 120      | 5,28600 | 119      | 5,28719 | 119      | 5,28838 | 119      | 147, |
| 5,29552 | 119      | 5,29671 | 119      | 5,29790 | 119      | 5,29909 | 118      | 5,30027 | 119      | 148, |
| 5,30738 | 119      | 5,30857 | 118      | 5,30975 | 118      | 5,31093 | 118      | 5,31211 | 118      | 149, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,31919 | 118      | 5,32037 | 118      | 5,32155 | 117      | 5,32272 | 118      | 5,32390 | 117      | 150, |
| 5,33095 | 117      | 5,33212 | 117      | 5,33329 | 117      | 5,33446 | 117      | 5,33563 | 117      | 151, |
| 5,34265 | 117      | 5,34382 | 116      | 5,34498 | 117      | 5,34615 | 117      | 5,34732 | 116      | 152, |
| 5,35430 | 116      | 5,35546 | 117      | 5,35663 | 116      | 5,35779 | 116      | 5,35895 | 116      | 153, |
| 5,36590 | 116      | 5,36706 | 116      | 5,36822 | 115      | 5,36937 | 116      | 5,37053 | 116      | 154, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,37746 | 115      | 5,37861 | 115      | 5,37976 | 115      | 5,38091 | 115      | 5,38206 | 115      | 155, |
| 5,38896 | 115      | 5,39011 | 114      | 5,39125 | 115      | 5,39240 | 115      | 5,39355 | 114      | 156, |
| 5,40041 | 114      | 5,40155 | 115      | 5,40270 | 114      | 5,40384 | 114      | 5,40498 | 114      | 157, |
| 5,41182 | 113      | 5,41295 | 114      | 5,41409 | 114      | 5,41523 | 114      | 5,41637 | 113      | 158, |
| 5,42317 | 114      | 5,42431 | 113      | 5,42544 | 113      | 5,42657 | 113      | 5,42770 | 114      | 159, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,43448 | 113      | 5,43561 | 113      | 5,43674 | 113      | 5,43787 | 113      | 5,43900 | 112      | 160, |
| 5,44575 | 112      | 5,44687 | 112      | 5,44799 | 113      | 5,44912 | 112      | 5,45024 | 112      | 161, |
| 5,45696 | 112      | 5,45808 | 112      | 5,45920 | 112      | 5,46032 | 112      | 5,46144 | 112      | 162, |
| 5,46814 | 111      | 5,46925 | 111      | 5,47036 | 112      | 5,47148 | 111      | 5,47259 | 111      | 163, |
| 5,47926 | 111      | 5,48037 | 111      | 5,48148 | 111      | 5,48259 | 111      | 5,48370 | 111      | 164, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,49034 | 111      | 5,49145 | 110      | 5,49255 | 111      | 5,49366 | 110      | 5,49476 | 110      | 165, |
| 5,50138 | 110      | 5,50248 | 110      | 5,50358 | 110      | 5,50468 | 110      | 5,50578 | 110      | 166, |
| 5,51237 | 110      | 5,51347 | 109      | 5,51456 | 110      | 5,51566 | 109      | 5,51675 | 110      | 167, |
| 5,52332 | 109      | 5,52441 | 109      | 5,52550 | 109      | 5,52659 | 109      | 5,52768 | 109      | 168, |
| 5,53422 | 109      | 5,53531 | 109      | 5,53640 | 108      | 5,53748 | 109      | 5,53857 | 109      | 169, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,54508 | 109      | 5,54617 | 108      | 5,54725 | 108      | 5,54833 | 109      | 5,54942 | 108      | 170, |
| 5,55590 | 108      | 5,55698 | 108      | 5,55806 | 108      | 5,55914 | 108      | 5,56022 | 108      | 171, |
| 5,56668 | 108      | 5,56776 | 107      | 5,56883 | 108      | 5,56991 | 107      | 5,57098 | 107      | 172, |
| 5,57742 | 107      | 5,57849 | 107      | 5,57956 | 107      | 5,58063 | 107      | 5,58170 | 107      | 173, |
| 5,58811 | 107      | 5,58918 | 107      | 5,59025 | 106      | 5,59131 | 107      | 5,59238 | 106      | 174, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,59877 | 106      | 5,59983 | 106      | 5,60089 | 107      | 5,60196 | 106      | 5,60302 | 106      | 175, |
| 5,60938 | 106      | 5,61044 | 106      | 5,61150 | 106      | 5,61256 | 105      | 5,61361 | 106      | 176, |
| 5,61995 | 106      | 5,62101 | 105      | 5,62206 | 106      | 5,62312 | 105      | 5,62417 | 106      | 177, |
| 5,63049 | 105      | 5,63154 | 105      | 5,63259 | 105      | 5,63364 | 105      | 5,63469 | 105      | 178, |
| 5,64098 | 105      | 5,64203 | 105      | 5,64308 | 104      | 5,64412 | 105      | 5,64517 | 105      | 179, |

$\sqrt[3]{x}$

The error of the approximations given on pp. 132 and 133 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000509 + the error of rounding off the result.

An example of interpolation is given on p. 127.



# VIII. Pierwiastki sześciennne ( $\sqrt[3]{x}$ )

| $x$  | 0       | $\delta$ | 1       | $\delta$ | 2       | $\delta$ | 3       | $\delta$ | 4       | $\delta$ |
|------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| 180, | 5,64622 | 104      | 5,64726 | 105      | 5,64831 | 104      | 5,64935 | 105      | 5,65040 | 104      |
| 181, | 5,65665 | 104      | 5,65769 | 105      | 5,65874 | 104      | 5,65978 | 104      | 5,66082 | 104      |
| 182, | 5,66705 | 104      | 5,66809 | 104      | 5,66913 | 103      | 5,67016 | 104      | 5,67120 | 104      |
| 183, | 5,67741 | 104      | 5,67845 | 103      | 5,67948 | 103      | 5,68051 | 103      | 5,68154 | 104      |
| 184, | 5,68773 | 103      | 5,68876 | 103      | 5,68979 | 103      | 5,69082 | 103      | 5,69185 | 103      |
| 185, | 5,69802 | 103      | 5,69905 | 102      | 5,70007 | 103      | 5,70110 | 102      | 5,70212 | 103      |
| 186, | 5,70827 | 102      | 5,70929 | 102      | 5,71031 | 102      | 5,71133 | 103      | 5,71236 | 102      |
| 187, | 5,71848 | 102      | 5,71950 | 102      | 5,72052 | 102      | 5,72154 | 101      | 5,72255 | 102      |
| 188, | 5,72865 | 102      | 5,72967 | 102      | 5,73069 | 101      | 5,73170 | 101      | 5,73271 | 102      |
| 189, | 5,73879 | 102      | 5,73981 | 101      | 5,74082 | 101      | 5,74183 | 101      | 5,74284 | 101      |
| 190, | 5,74890 | 101      | 5,74991 | 100      | 5,75091 | 101      | 5,75192 | 101      | 5,75293 | 101      |
| 191, | 5,75897 | 100      | 5,75997 | 100      | 5,76097 | 101      | 5,76198 | 100      | 5,76298 | 101      |
| 192, | 5,76900 | 100      | 5,77000 | 100      | 5,77100 | 100      | 5,77200 | 100      | 5,77300 | 100      |
| 193, | 5,77900 | 099      | 5,77999 | 100      | 5,78099 | 100      | 5,78199 | 100      | 5,78299 | 099      |
| 194, | 5,78896 | 099      | 5,78995 | 100      | 5,79095 | 099      | 5,79194 | 100      | 5,79294 | 099      |
| 195, | 5,79889 | 099      | 5,79988 | 099      | 5,80087 | 099      | 5,80186 | 099      | 5,80285 | 099      |
| 196, | 5,80879 | 098      | 5,80977 | 099      | 5,81076 | 099      | 5,81175 | 098      | 5,81273 | 099      |
| 197, | 5,81865 | 098      | 5,81963 | 099      | 5,82062 | 098      | 5,82160 | 098      | 5,82258 | 099      |
| 198, | 5,82848 | 098      | 5,82946 | 098      | 5,83044 | 098      | 5,83142 | 098      | 5,83240 | 098      |
| 199, | 5,83827 | 098      | 5,83925 | 098      | 5,84023 | 097      | 5,84120 | 098      | 5,84218 | 098      |
| 20   | 5,84804 | 973      | 5,85777 | 969      | 5,86746 | 967      | 5,87713 | 964      | 5,88677 | 960      |
| 21   | 5,94392 | 942      | 5,95334 | 939      | 5,96273 | 936      | 5,97209 | 933      | 5,98142 | 931      |
| 22   | 6,03681 | 913      | 6,04594 | 911      | 6,05505 | 908      | 6,06413 | 905      | 6,07318 | 902      |
| 23   | 6,12693 | 886      | 6,13579 | 884      | 6,14463 | 882      | 6,15345 | 879      | 6,16224 | 877      |
| 24   | 6,21447 | 861      | 6,22308 | 860      | 6,23168 | 857      | 6,24025 | 855      | 6,24880 | 852      |
| 25   | 6,29961 | 838      | 6,30799 | 837      | 6,31636 | 834      | 6,32470 | 833      | 6,33303 | 830      |
| 26   | 6,38250 | 818      | 6,39068 | 815      | 6,39883 | 813      | 6,40696 | 811      | 6,41507 | 809      |
| 27   | 6,46330 | 797      | 6,47127 | 795      | 6,47922 | 793      | 6,48715 | 792      | 6,49507 | 789      |
| 28   | 6,54213 | 778      | 6,54991 | 776      | 6,55767 | 774      | 6,56541 | 773      | 6,57314 | 770      |
| 29   | 6,61911 | 760      | 6,62671 | 758      | 6,63429 | 756      | 6,64185 | 755      | 6,64940 | 753      |
| 30   | 6,69433 | 743      | 6,70176 | 741      | 6,70917 | 740      | 6,71657 | 738      | 6,72395 | 737      |
| 31   | 6,76790 | 727      | 6,77517 | 725      | 6,78242 | 724      | 6,78966 | 722      | 6,79688 | 721      |
| 32   | 6,83990 | 712      | 6,84702 | 710      | 6,85412 | 709      | 6,86121 | 708      | 6,86829 | 705      |
| 33   | 6,91042 | 698      | 6,91740 | 696      | 6,92436 | 694      | 6,93130 | 693      | 6,93823 | 692      |
| 34   | 6,97953 | 684      | 6,98637 | 682      | 6,99319 | 681      | 7,00000 | 680      | 7,00680 | 678      |
| 35   | 7,04730 | 670      | 7,05400 | 670      | 7,06070 | 668      | 7,06738 | 666      | 7,07404 | 666      |
| 36   | 7,11379 | 658      | 7,12037 | 657      | 7,12694 | 655      | 7,13349 | 655      | 7,14004 | 653      |
| 37   | 7,17905 | 647      | 7,18552 | 645      | 7,19197 | 643      | 7,19840 | 643      | 7,20483 | 642      |
| 38   | 7,24316 | 634      | 7,24950 | 634      | 7,25584 | 633      | 7,26217 | 631      | 7,26848 | 631      |
| 39   | 7,30614 | 624      | 7,31238 | 623      | 7,31861 | 622      | 7,32483 | 621      | 7,33104 | 619      |
| 40   | 7,36806 | 614      | 7,37420 | 612      | 7,38032 | 612      | 7,38644 | 610      | 7,39254 | 610      |
| 41   | 7,42896 | 603      | 7,43499 | 603      | 7,44102 | 601      | 7,44703 | 601      | 7,45304 | 600      |
| 42   | 7,48887 | 594      | 7,49481 | 593      | 7,50074 | 592      | 7,50666 | 591      | 7,51257 | 590      |
| 43   | 7,54784 | 585      | 7,55369 | 584      | 7,55953 | 582      | 7,56535 | 582      | 7,57117 | 581      |
| 44   | 7,60590 | 576      | 7,61166 | 575      | 7,61741 | 574      | 7,62315 | 573      | 7,62888 | 573      |
| 45   | 7,66309 | 568      | 7,66877 | 566      | 7,67443 | 566      | 7,68009 | 564      | 7,68573 | 564      |
| 46   | 7,71944 | 559      | 7,72503 | 558      | 7,73061 | 558      | 7,73619 | 556      | 7,74175 | 556      |
| 47   | 7,77498 | 551      | 7,78049 | 550      | 7,78599 | 550      | 7,79149 | 548      | 7,79697 | 548      |
| 48   | 7,82974 | 543      | 7,83517 | 542      | 7,84059 | 542      | 7,84601 | 541      | 7,85142 | 541      |
| 49   | 7,88374 | 535      | 7,88909 | 536      | 7,89445 | 534      | 7,89979 | 534      | 7,90513 | 533      |

Błąd przybliżeń podanych na str. 134 i 135 jest nie większy niż 0,000005. Błąd przybliżenia otrzymanego przez interpolację liniową jest dla  $180 < x < 200$  mniejszy niż 0,00000505 + błąd zaokrąglenia wyniku, a dla  $200 < x < 500$  mniejszy niż 0,00000730 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.



# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | $x$  |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|------|
| 5,65144 | 104      | 5,65248 | 105      | 5,65353 | 104      | 5,65457 | 104      | 5,65561 | 104      | 180, |
| 5,66186 | 104      | 5,66290 | 104      | 5,66394 | 103      | 5,66497 | 104      | 5,66601 | 104      | 181, |
| 5,67224 | 103      | 5,67327 | 104      | 5,67431 | 103      | 5,67534 | 104      | 5,67638 | 103      | 182, |
| 5,68258 | 103      | 5,68361 | 103      | 5,68464 | 103      | 5,68567 | 103      | 5,68670 | 103      | 183, |
| 5,69288 | 103      | 5,69391 | 103      | 5,69494 | 103      | 5,69597 | 102      | 5,69699 | 103      | 184, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,70315 | 102      | 5,70417 | 103      | 5,70520 | 102      | 5,70622 | 102      | 5,70724 | 103      | 185, |
| 5,71338 | 102      | 5,71440 | 102      | 5,71542 | 102      | 5,71644 | 102      | 5,71746 | 102      | 186, |
| 5,72357 | 102      | 5,72459 | 102      | 5,72561 | 101      | 5,72662 | 102      | 5,72764 | 101      | 187, |
| 5,73373 | 101      | 5,73474 | 102      | 5,73576 | 101      | 5,73677 | 101      | 5,73778 | 101      | 188, |
| 5,74385 | 101      | 5,74486 | 101      | 5,74587 | 101      | 5,74688 | 101      | 5,74789 | 101      | 189, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,75394 | 100      | 5,75494 | 101      | 5,75595 | 100      | 5,75695 | 101      | 5,75796 | 101      | 190, |
| 5,76399 | 100      | 5,76499 | 100      | 5,76599 | 100      | 5,76699 | 101      | 5,76800 | 100      | 191, |
| 5,77400 | 100      | 5,77500 | 100      | 5,77600 | 100      | 5,77700 | 100      | 5,77800 | 100      | 192, |
| 5,78398 | 100      | 5,78498 | 099      | 5,78597 | 100      | 5,78697 | 100      | 5,78797 | 099      | 193, |
| 5,79393 | 099      | 5,79492 | 099      | 5,79591 | 100      | 5,79691 | 099      | 5,79790 | 099      | 194, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,80384 | 099      | 5,80483 | 099      | 5,80582 | 099      | 5,80681 | 099      | 5,80780 | 099      | 195, |
| 5,81372 | 099      | 5,81471 | 098      | 5,81569 | 099      | 5,81668 | 098      | 5,81766 | 099      | 196, |
| 5,82357 | 098      | 5,82455 | 098      | 5,82553 | 098      | 5,82651 | 099      | 5,82750 | 098      | 197, |
| 5,83338 | 098      | 5,83436 | 098      | 5,83534 | 098      | 5,83632 | 097      | 5,83729 | 098      | 198, |
| 5,84316 | 097      | 5,84413 | 098      | 5,84511 | 098      | 5,84609 | 097      | 5,84706 | 098      | 199, |
|         |          |         |          |         |          |         |          |         |          |      |
| 5,89637 | 957      | 5,90594 | 954      | 5,91548 | 951      | 5,92499 | 948      | 5,93447 | 945      | 20   |
| 5,99073 | 927      | 6,00000 | 925      | 6,00925 | 921      | 6,01846 | 919      | 6,02765 | 916      | 21   |
| 6,08220 | 900      | 6,09120 | 897      | 6,10017 | 894      | 6,10911 | 892      | 6,11803 | 890      | 22   |
| 6,17101 | 874      | 6,17975 | 871      | 6,18846 | 869      | 6,19715 | 867      | 6,20582 | 865      | 23   |
| 6,25732 | 851      | 6,26583 | 848      | 6,27431 | 845      | 6,28276 | 843      | 6,29119 | 842      | 24   |
|         |          |         |          |         |          |         |          |         |          |      |
| 6,34133 | 827      | 6,34960 | 826      | 6,35786 | 824      | 6,36610 | 821      | 6,37431 | 819      | 25   |
| 6,42316 | 807      | 6,43123 | 805      | 6,43928 | 803      | 6,44731 | 800      | 6,45531 | 799      | 26   |
| 6,50296 | 787      | 6,51083 | 785      | 6,51868 | 784      | 6,52652 | 782      | 6,53434 | 779      | 27   |
| 6,58084 | 769      | 6,58853 | 767      | 6,59620 | 765      | 6,60385 | 764      | 6,61149 | 762      | 28   |
| 6,65693 | 751      | 6,66444 | 750      | 6,67194 | 748      | 6,67942 | 746      | 6,68688 | 745      | 29   |
|         |          |         |          |         |          |         |          |         |          |      |
| 6,73132 | 734      | 6,73866 | 734      | 6,74600 | 731      | 6,75331 | 730      | 6,76061 | 729      | 30   |
| 6,80409 | 719      | 6,81128 | 718      | 6,81846 | 716      | 6,82562 | 715      | 6,83277 | 713      | 31   |
| 6,87534 | 705      | 6,88239 | 703      | 6,88942 | 701      | 6,89643 | 701      | 6,90344 | 698      | 32   |
| 6,94515 | 690      | 6,95205 | 689      | 6,95894 | 688      | 6,96582 | 686      | 6,97268 | 685      | 33   |
| 7,01358 | 677      | 7,02035 | 676      | 7,02711 | 674      | 7,03385 | 673      | 7,04058 | 672      | 34   |
|         |          |         |          |         |          |         |          |         |          |      |
| 7,08070 | 664      | 7,08734 | 663      | 7,09397 | 662      | 7,10059 | 660      | 7,10719 | 660      | 35   |
| 7,14657 | 652      | 7,15309 | 651      | 7,15960 | 650      | 7,16610 | 648      | 7,17258 | 647      | 36   |
| 7,21125 | 640      | 7,21765 | 640      | 7,22405 | 638      | 7,23043 | 637      | 7,23680 | 636      | 37   |
| 7,27479 | 629      | 7,28108 | 628      | 7,28736 | 627      | 7,29363 | 626      | 7,29989 | 625      | 38   |
| 7,33723 | 619      | 7,34342 | 618      | 7,34960 | 616      | 7,35576 | 616      | 7,36192 | 614      | 39   |
|         |          |         |          |         |          |         |          |         |          |      |
| 7,39864 | 608      | 7,40472 | 608      | 7,41080 | 606      | 7,41686 | 605      | 7,42291 | 605      | 40   |
| 7,45904 | 598      | 7,46502 | 598      | 7,47100 | 597      | 7,47697 | 595      | 7,48292 | 595      | 41   |
| 7,51847 | 590      | 7,52437 | 588      | 7,53025 | 587      | 7,53612 | 587      | 7,54199 | 585      | 42   |
| 7,57698 | 581      | 7,58279 | 579      | 7,58858 | 578      | 7,59436 | 578      | 7,60014 | 576      | 43   |
| 7,63461 | 571      | 7,64032 | 571      | 7,64603 | 569      | 7,65172 | 569      | 7,65741 | 568      | 44   |
|         |          |         |          |         |          |         |          |         |          |      |
| 7,69137 | 563      | 7,69700 | 562      | 7,70262 | 562      | 7,70824 | 560      | 7,71384 | 560      | 45   |
| 7,74731 | 555      | 7,75286 | 554      | 7,75840 | 554      | 7,76394 | 552      | 7,76946 | 552      | 46   |
| 7,80245 | 548      | 7,80793 | 546      | 7,81339 | 546      | 7,81885 | 544      | 7,82429 | 545      | 47   |
| 7,85683 | 539      | 7,86222 | 539      | 7,86761 | 538      | 7,87299 | 538      | 7,87837 | 537      | 48   |
| 7,91046 | 532      | 7,91578 | 532      | 7,92110 | 531      | 7,92641 | 530      | 7,93171 | 530      | 49   |

$\sqrt[3]{x}$

The error of the approximations given on pp. 134 and 135 is not greater than 0,000005. The error of an approximation obtained by linear interpolation is for  $180 < x < 200$  less than 0,00000505 + the error of rounding off the result and for  $200 < x < 500$  less than 0,00000730 + the error of rounding off the result.

An example of interpolation is given on p. 127.

# VIII. Pierwiastki sześciennie ( $\sqrt[3]{x}$ )

| x  | 0       | δ   | 1       | δ   | 2       | δ   | 3       | δ   | 4       | δ   |
|----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
| 50 | 7,93701 | 528 | 7,94229 | 528 | 7,94757 | 528 | 7,95285 | 526 | 7,95811 | 526 |
| 51 | 7,98957 | 522 | 7,99479 | 521 | 8,00000 | 520 | 8,00520 | 520 | 8,01040 | 519 |
| 52 | 8,04145 | 515 | 8,04660 | 515 | 8,05175 | 514 | 8,05689 | 513 | 8,06202 | 512 |
| 53 | 8,09267 | 509 | 8,09776 | 508 | 8,10284 | 507 | 8,10791 | 507 | 8,11298 | 506 |
| 54 | 8,14325 | 503 | 8,14828 | 501 | 8,15329 | 502 | 8,15831 | 500 | 8,16331 | 500 |
| 55 | 8,19321 | 497 | 8,19818 | 495 | 8,20313 | 495 | 8,20808 | 495 | 8,21303 | 494 |
| 56 | 8,24257 | 490 | 8,24747 | 490 | 8,25237 | 489 | 8,25726 | 489 | 8,26215 | 488 |
| 57 | 8,29134 | 485 | 8,29619 | 484 | 8,30103 | 484 | 8,30587 | 482 | 8,31069 | 483 |
| 58 | 8,33955 | 479 | 8,34434 | 479 | 8,34913 | 477 | 8,35390 | 478 | 8,35868 | 477 |
| 59 | 8,38721 | 473 | 8,39194 | 473 | 8,39667 | 473 | 8,40140 | 472 | 8,40612 | 471 |
| 60 | 8,43433 | 468 | 8,43901 | 468 | 8,44369 | 467 | 8,44836 | 467 | 8,45303 | 466 |
| 61 | 8,48093 | 463 | 8,48556 | 462 | 8,49018 | 463 | 8,49481 | 461 | 8,49942 | 461 |
| 62 | 8,52702 | 458 | 8,53160 | 458 | 8,53618 | 457 | 8,54075 | 457 | 8,54532 | 456 |
| 63 | 8,57262 | 453 | 8,57715 | 453 | 8,58168 | 452 | 8,58620 | 452 | 8,59072 | 452 |
| 64 | 8,61774 | 448 | 8,62222 | 449 | 8,62671 | 447 | 8,63118 | 448 | 8,63566 | 446 |
| 65 | 8,66239 | 444 | 8,66683 | 444 | 8,67127 | 443 | 8,67570 | 442 | 8,68012 | 443 |
| 66 | 8,70659 | 439 | 8,71098 | 439 | 8,71537 | 439 | 8,71976 | 438 | 8,72414 | 438 |
| 67 | 8,75034 | 435 | 8,75469 | 435 | 8,75904 | 434 | 8,76338 | 434 | 8,76772 | 433 |
| 68 | 8,79366 | 431 | 8,79797 | 430 | 8,80227 | 430 | 8,80657 | 430 | 8,81087 | 429 |
| 69 | 8,83656 | 426 | 8,84082 | 427 | 8,84509 | 425 | 8,84934 | 426 | 8,85360 | 425 |
| 70 | 8,87904 | 423 | 8,88327 | 422 | 8,88749 | 422 | 8,89171 | 421 | 8,89592 | 421 |
| 71 | 8,92112 | 419 | 8,92531 | 418 | 8,92949 | 418 | 8,93367 | 417 | 8,93784 | 417 |
| 72 | 8,96281 | 415 | 8,96696 | 414 | 8,97110 | 414 | 8,97524 | 414 | 8,97938 | 413 |
| 73 | 9,00411 | 411 | 9,00822 | 411 | 9,01233 | 410 | 9,01643 | 410 | 9,02053 | 409 |
| 74 | 9,04504 | 407 | 9,04911 | 407 | 9,05318 | 407 | 9,05725 | 406 | 9,06131 | 406 |
| 75 | 9,08560 | 404 | 9,08964 | 403 | 9,09367 | 403 | 9,09770 | 403 | 9,10173 | 402 |
| 76 | 9,12581 | 400 | 9,12981 | 399 | 9,13380 | 400 | 9,13780 | 399 | 9,14179 | 398 |
| 77 | 9,16566 | 396 | 9,16962 | 397 | 9,17359 | 395 | 9,17754 | 396 | 9,18150 | 395 |
| 78 | 9,20516 | 394 | 9,20910 | 393 | 9,21303 | 392 | 9,21695 | 392 | 9,22087 | 392 |
| 79 | 9,24434 | 389 | 9,24823 | 390 | 9,25213 | 389 | 9,25602 | 389 | 9,25991 | 389 |
| 80 | 9,28318 | 386 | 9,28704 | 387 | 9,29091 | 386 | 9,29477 | 385 | 9,29862 | 386 |
| 81 | 9,32170 | 383 | 9,32553 | 383 | 9,32936 | 383 | 9,33319 | 383 | 9,33702 | 382 |
| 82 | 9,35990 | 380 | 9,36370 | 381 | 9,36751 | 379 | 9,37130 | 380 | 9,37510 | 379 |
| 83 | 9,39780 | 377 | 9,40157 | 377 | 9,40534 | 377 | 9,40911 | 376 | 9,41287 | 376 |
| 84 | 9,43539 | 374 | 9,43913 | 374 | 9,44287 | 374 | 9,44661 | 373 | 9,45034 | 373 |
| 85 | 9,47268 | 372 | 9,47640 | 371 | 9,48011 | 370 | 9,48381 | 371 | 9,48752 | 370 |
| 86 | 9,50969 | 368 | 9,51337 | 368 | 9,51705 | 368 | 9,52073 | 368 | 9,52441 | 367 |
| 87 | 9,54640 | 366 | 9,55006 | 365 | 9,55371 | 365 | 9,55736 | 365 | 9,56101 | 365 |
| 88 | 9,58284 | 363 | 9,58647 | 362 | 9,59009 | 363 | 9,59372 | 362 | 9,59734 | 361 |
| 89 | 9,61900 | 360 | 9,62260 | 360 | 9,62620 | 360 | 9,62980 | 359 | 9,63339 | 359 |
| 90 | 9,65489 | 358 | 9,65847 | 357 | 9,66204 | 357 | 9,66561 | 357 | 9,66918 | 356 |
| 91 | 9,69052 | 355 | 9,69407 | 355 | 9,69762 | 354 | 9,70116 | 354 | 9,70470 | 354 |
| 92 | 9,72589 | 352 | 9,72941 | 352 | 9,73293 | 352 | 9,73645 | 351 | 9,73996 | 352 |
| 93 | 9,76100 | 350 | 9,76450 | 349 | 9,76799 | 349 | 9,77148 | 349 | 9,77497 | 349 |
| 94 | 9,79586 | 347 | 9,79933 | 347 | 9,80280 | 347 | 9,80627 | 347 | 9,80974 | 346 |
| 95 | 9,83048 | 344 | 9,83392 | 345 | 9,83737 | 344 | 9,84081 | 344 | 9,84425 | 344 |
| 96 | 9,86485 | 342 | 9,86827 | 342 | 9,87169 | 342 | 9,87511 | 342 | 9,87853 | 342 |
| 97 | 9,89898 | 340 | 9,90238 | 340 | 9,90578 | 340 | 9,90918 | 339 | 9,91257 | 339 |
| 98 | 9,93288 | 338 | 9,93626 | 338 | 9,93964 | 337 | 9,94301 | 337 | 9,94638 | 337 |
| 99 | 9,96655 | 336 | 9,96991 | 335 | 9,97326 | 335 | 9,97661 | 335 | 9,97996 | 335 |

Błąd przybliżeń podanych na str. 136 i 137 jest nie większy niż 0,000005, a błąd przybliżenia otrzymanego przez interpolację liniową jest mniejszy niż 0,00000589 + błąd zaokrąglenia wyniku.

Przykład interpolacji na str. 126.

# VIII. Cube roots ( $\sqrt[3]{x}$ )

| 5       | $\delta$ | 6       | $\delta$ | 7       | $\delta$ | 8       | $\delta$ | 9       | $\delta$ | x  |
|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|----|
| 7,96337 | 526      | 7,96863 | 524      | 7,97387 | 524      | 7,97911 | 523      | 7,98434 | 523      | 50 |
| 8,01559 | 519      | 8,02078 | 518      | 8,02596 | 517      | 8,03113 | 516      | 8,03629 | 516      | 51 |
| 8,06714 | 512      | 8,07226 | 511      | 8,07737 | 511      | 8,08248 | 510      | 8,08758 | 509      | 52 |
| 8,11804 | 506      | 8,12310 | 504      | 8,12814 | 505      | 8,13319 | 503      | 8,13822 | 503      | 53 |
| 8,16831 | 499      | 8,17330 | 499      | 8,17829 | 498      | 8,18327 | 497      | 8,18824 | 497      | 54 |
|         |          |         |          |         |          |         |          |         |          |    |
| 8,21797 | 493      | 8,22290 | 493      | 8,22783 | 492      | 8,23275 | 491      | 8,23766 | 491      | 55 |
| 8,26703 | 487      | 8,27190 | 487      | 8,27677 | 487      | 8,28164 | 485      | 8,28649 | 485      | 56 |
| 8,31552 | 482      | 8,32034 | 481      | 8,32515 | 480      | 8,32995 | 481      | 8,33476 | 479      | 57 |
| 8,36345 | 476      | 8,36821 | 476      | 8,37297 | 475      | 8,37772 | 475      | 8,38247 | 474      | 58 |
| 8,41083 | 471      | 8,41554 | 471      | 8,42025 | 469      | 8,42494 | 470      | 8,42964 | 469      | 59 |
|         |          |         |          |         |          |         |          |         |          |    |
| 8,45769 | 466      | 8,46235 | 465      | 8,46700 | 465      | 8,47165 | 464      | 8,47629 | 464      | 60 |
| 8,50403 | 461      | 8,50864 | 460      | 8,51324 | 460      | 8,51784 | 459      | 8,52243 | 459      | 61 |
| 8,54988 | 456      | 8,55444 | 455      | 8,55899 | 455      | 8,56354 | 454      | 8,56808 | 454      | 62 |
| 8,59524 | 451      | 8,59975 | 450      | 8,60425 | 450      | 8,60875 | 450      | 8,61325 | 449      | 63 |
| 8,64012 | 447      | 8,64459 | 445      | 8,64904 | 446      | 8,65350 | 445      | 8,65795 | 444      | 64 |
|         |          |         |          |         |          |         |          |         |          |    |
| 8,68455 | 441      | 8,68896 | 442      | 8,69338 | 440      | 8,69778 | 441      | 8,70219 | 440      | 65 |
| 8,72852 | 437      | 8,73289 | 437      | 8,73726 | 436      | 8,74162 | 436      | 8,74598 | 436      | 66 |
| 8,77205 | 433      | 8,77638 | 433      | 8,78071 | 432      | 8,78503 | 432      | 8,78935 | 431      | 67 |
| 8,81516 | 429      | 8,81945 | 428      | 8,82373 | 428      | 8,82801 | 427      | 8,83228 | 428      | 68 |
| 8,85785 | 425      | 8,86210 | 424      | 8,86634 | 424      | 8,87058 | 423      | 8,87481 | 423      | 69 |
|         |          |         |          |         |          |         |          |         |          |    |
| 8,90013 | 421      | 8,90434 | 420      | 8,90854 | 420      | 8,91274 | 419      | 8,91693 | 419      | 70 |
| 8,94201 | 417      | 8,94618 | 416      | 8,95034 | 416      | 8,95450 | 416      | 8,95866 | 415      | 71 |
| 8,98351 | 413      | 8,98764 | 412      | 8,99176 | 412      | 8,99588 | 412      | 9,00000 | 411      | 72 |
| 9,02462 | 409      | 9,02871 | 409      | 9,03280 | 409      | 9,03689 | 408      | 9,04097 | 407      | 73 |
| 9,06537 | 405      | 9,06942 | 405      | 9,07347 | 405      | 9,07752 | 404      | 9,08156 | 404      | 74 |
|         |          |         |          |         |          |         |          |         |          |    |
| 9,10575 | 402      | 9,10977 | 401      | 9,11378 | 401      | 9,11779 | 401      | 9,12180 | 401      | 75 |
| 9,14577 | 399      | 9,14976 | 398      | 9,15374 | 397      | 9,15771 | 398      | 9,16169 | 397      | 76 |
| 9,18545 | 395      | 9,18940 | 395      | 9,19335 | 394      | 9,19729 | 394      | 9,20123 | 393      | 77 |
| 9,22479 | 392      | 9,22871 | 391      | 9,23262 | 391      | 9,23653 | 390      | 9,24043 | 391      | 78 |
| 9,26380 | 388      | 9,26768 | 388      | 9,27156 | 388      | 9,27544 | 387      | 9,27931 | 387      | 79 |
|         |          |         |          |         |          |         |          |         |          |    |
| 9,30248 | 385      | 9,30633 | 385      | 9,31018 | 384      | 9,31402 | 384      | 9,31786 | 384      | 80 |
| 9,34084 | 382      | 9,34466 | 381      | 9,34847 | 382      | 9,35229 | 381      | 9,35610 | 380      | 81 |
| 9,37889 | 379      | 9,38268 | 378      | 9,38646 | 378      | 9,39024 | 378      | 9,39402 | 378      | 82 |
| 9,41663 | 376      | 9,42039 | 375      | 9,42414 | 375      | 9,42789 | 375      | 9,43164 | 375      | 83 |
| 9,45407 | 373      | 9,45780 | 372      | 9,46152 | 373      | 9,46525 | 372      | 9,46897 | 371      | 84 |
|         |          |         |          |         |          |         |          |         |          |    |
| 9,49122 | 370      | 9,49492 | 369      | 9,49861 | 370      | 9,50231 | 369      | 9,50600 | 369      | 85 |
| 9,52808 | 367      | 9,53175 | 367      | 9,53542 | 366      | 9,53908 | 366      | 9,54274 | 366      | 86 |
| 9,56466 | 364      | 9,56830 | 364      | 9,57194 | 363      | 9,57557 | 364      | 9,57921 | 363      | 87 |
| 9,60095 | 362      | 9,60457 | 361      | 9,60818 | 361      | 9,61179 | 361      | 9,61540 | 360      | 88 |
| 9,63698 | 359      | 9,64057 | 358      | 9,64415 | 359      | 9,64774 | 358      | 9,65132 | 357      | 89 |
|         |          |         |          |         |          |         |          |         |          |    |
| 9,67274 | 356      | 9,67630 | 356      | 9,67986 | 356      | 9,68342 | 355      | 9,68697 | 355      | 90 |
| 9,70824 | 353      | 9,71177 | 354      | 9,71531 | 353      | 9,71884 | 352      | 9,72236 | 353      | 91 |
| 9,74348 | 351      | 9,74699 | 350      | 9,75049 | 351      | 9,75400 | 350      | 9,75750 | 350      | 92 |
| 9,77846 | 349      | 9,78195 | 348      | 9,78543 | 348      | 9,78891 | 348      | 9,79239 | 347      | 93 |
| 9,81320 | 346      | 9,81666 | 346      | 9,82012 | 345      | 9,82357 | 346      | 9,82703 | 345      | 94 |
|         |          |         |          |         |          |         |          |         |          |    |
| 9,84769 | 344      | 9,85113 | 343      | 9,85456 | 343      | 9,85799 | 343      | 9,86142 | 343      | 95 |
| 9,88195 | 341      | 9,88536 | 341      | 9,88877 | 340      | 9,89217 | 341      | 9,89558 | 340      | 96 |
| 9,91596 | 339      | 9,91935 | 339      | 9,92274 | 338      | 9,92612 | 338      | 9,92950 | 338      | 97 |
| 9,94975 | 336      | 9,95311 | 337      | 9,95648 | 336      | 9,95984 | 336      | 9,96320 | 335      | 98 |
| 9,98331 | 334      | 9,98665 | 334      | 9,98999 | 334      | 9,99333 | 334      | 9,99667 | 333      | 99 |

$\sqrt[3]{x}$

The error of the approximations given on pp. 136 and 137 is not greater than 0,000005 and the error of an approximation obtained by linear interpolation is less than 0,00000589 + the error of rounding off the result.

An example of interpolation is given on p. 127.