

## 常用対数 (1)

常用対数とは？

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学習のポイント

常用対数の意味と、その値の求め方を学びます。

- ① 10を底とする対数
- ② 常用対数表
- ③ 常用対数表にない数の常用対数の値の求め方

### 10を底とする対数

10を底とする対数  $\log_{10} M$  を常用対数<sup>じょうようたいすう</sup>という。(10を底とする  $M$  の常用対数は  $\log_{10} M$ )

### 常用対数表

常用対数表 (1)

数	0	1	2	3	4	5	6	7	8	9
1.0	.0000	.0043	.0086	.0128	.0170	.0212	.0253	.0294	.0334	.0374
1.1	.0414	.0453	.0492	.0531	.0569	.0607	.0645	.0682	.0719	.0755
1.2	.0792	.0828	.0864	.0899	.0934	.0969	.1004	.1038	.1072	.1106
1.3	.1139	.1173	.1206	.1239	.1271	.1303	.1335	.1367	.1399	.1430
1.4	.1461	.1492	.1523	.1553	.1584	.1614	.1644	.1673	.1703	.1732
1.5	.1761	.1790	.1818	.1847	.1875	.1903	.1931	.1959	.1987	.2014
1.6	.2041	.2068	.2095	.2122	.2148	.2175	.2201	.2227	.2253	.2279
1.7	.2304	.2330	.2355	.2380	.2405	.2430	.2455	.2480	.2504	.2529
1.8	.2553	.2577	.2601	.2625	.2648	.2672	.2695	.2718	.2742	.2765
1.9	.2788	.2810	.2833	.2856	.2878	.2900	.2923	.2945	.2967	.2989
2.0	.3010	.3032	.3054	.3075	.3096	.3118	.3139	.3160	.3181	.3201
2.1	.3222	.3243	.3263	.3284	.3304	.3324	.3345	.3365	.3385	.3404
2.2	.3424	.3444	.3464	.3483	.3502	.3522	.3541	.3560	.3579	.3598
2.3	.3617	.3636	.3655	.3674	.3692	.3711	.3729	.3747	.3766	.3784
2.4	.3802	.3820	.3838	.3856	.3874	.3892	.3909	.3927	.3945	.3962
2.5	.3979	.3997	.4014	.4031	.4048	.4065	.4082	.4099	.4116	.4133
2.6	.4150	.4166	.4183	.4200	.4216	.4232	.4249	.4265	.4281	.4298
2.7	.4314	.4330	.4346	.4362	.4378	.4393	.4409	.4425	.4440	.4456
2.8	.4472	.4487	.4502	.4518	.4533	.4548	.4564	.4579	.4594	.4609
2.9	.4624	.4639	.4654	.4669	.4683	.4698	.4713	.4728	.4742	.4757
3.0	.4771	.4786	.4800	.4814	.4829	.4843	.4857	.4871	.4886	.4900
3.1	.4914	.4928	.4942	.4955	.4969	.4983	.4997	.5011	.5024	.5038
3.2	.5051	.5065	.5079	.5092	.5105	.5119	.5132	.5145	.5159	.5172
3.3	.5185	.5198	.5211	.5224	.5237	.5250	.5263	.5276	.5289	.5302
3.4	.5315	.5328	.5340	.5353	.5366	.5378	.5391	.5403	.5416	.5428
3.5	.5441	.5453	.5465	.5478	.5490	.5502	.5514	.5527	.5539	.5551
3.6	.5563	.5575	.5587	.5599	.5611	.5623	.5635	.5647	.5658	.5670
3.7	.5682	.5694	.5705	.5717	.5729	.5740	.5752	.5763	.5775	.5786
3.8	.5798	.5809	.5821	.5832	.5843	.5855	.5866	.5877	.5888	.5899
3.9	.5911	.5922	.5933	.5944	.5955	.5966	.5977	.5988	.5999	.6010
4.0	.6021	.6031	.6042	.6053	.6064	.6075	.6085	.6096	.6107	.6117
4.1	.6128	.6138	.6149	.6160	.6170	.6180	.6191	.6201	.6212	.6222
4.2	.6232	.6243	.6253	.6263	.6274	.6284	.6294	.6304	.6314	.6325
4.3	.6335	.6345	.6355	.6365	.6375	.6385	.6395	.6405	.6415	.6425
4.4	.6435	.6444	.6454	.6464	.6474	.6484	.6493	.6503	.6513	.6522
4.5	.6532	.6542	.6551	.6561	.6571	.6580	.6590	.6599	.6609	.6618

常用対数表 (2)

数	0	1	2	3	4	5	6	7	8	9
4.6	.6628	.6637	.6646	.6656	.6665	.6675	.6684	.6693	.6702	.6712
4.7	.6721	.6730	.6739	.6749	.6758	.6767	.6776	.6785	.6794	.6803
4.8	.6812	.6821	.6830	.6839	.6848	.6857	.6866	.6875	.6884	.6893
4.9	.6902	.6911	.6920	.6928	.6937	.6946	.6955	.6964	.6972	.6981
5.0	.6990	.6998	.7007	.7016	.7024	.7033	.7042	.7050	.7059	.7067
5.1	.7076	.7084	.7093	.7101	.7110	.7118	.7126	.7135	.7143	.7152
5.2	.7160	.7168	.7177	.7185	.7193	.7202	.7210	.7218	.7226	.7235
5.3	.7243	.7251	.7259	.7267	.7275	.7284	.7292	.7300	.7308	.7316
5.4	.7324	.7332	.7340	.7348	.7356	.7364	.7372	.7380	.7388	.7396
5.5	.7404	.7412	.7419	.7427	.7435	.7443	.7451	.7459	.7466	.7474
5.6	.7482	.7490	.7497	.7505	.7513	.7520	.7528	.7536	.7543	.7551
5.7	.7559	.7566	.7574	.7582	.7589	.7597	.7604	.7612	.7619	.7627
5.8	.7634	.7642	.7649	.7657	.7664	.7672	.7679	.7686	.7694	.7701
5.9	.7709	.7716	.7723	.7731	.7738	.7745	.7752	.7760	.7767	.7774
6.0	.7782	.7789	.7796	.7803	.7810	.7818	.7825	.7832	.7839	.7846
6.1	.7853	.7860	.7868	.7875	.7882	.7889	.7896	.7903	.7910	.7917
6.2	.7924	.7931	.7938	.7945	.7952	.7959	.7966	.7973	.7980	.7987
6.3	.7993	.8000	.8007	.8014	.8021	.8028	.8035	.8041	.8048	.8055
6.4	.8062	.8069	.8075	.8082	.8089	.8096	.8102	.8109	.8116	.8122
6.5	.8129	.8136	.8142	.8149	.8156	.8162	.8169	.8176	.8182	.8189
6.6	.8195	.8202	.8209	.8215	.8222	.8228	.8235	.8241	.8248	.8254
6.7	.8261	.8267	.8274	.8280	.8287	.8293	.8299	.8306	.8312	.8319
6.8	.8325	.8331	.8338	.8344	.8351	.8357	.8363	.8370	.8376	.8382
6.9	.8388	.8395	.8401	.8407	.8414	.8420	.8426	.8432	.8439	.8445
7.0	.8451	.8457	.8463	.8470	.8476	.8482	.8488	.8494	.8500	.8506
7.1	.8513	.8519	.8525	.8531	.8537	.8543	.8549	.8555	.8561	.8567
7.2	.8573	.8579	.8585	.8591	.8597	.8603	.8609	.8615	.8621	.8627
7.3	.8633	.8639	.8645	.8651	.8657	.8663	.8669	.8675	.8681	.8686
7.4	.8692	.8698	.8704	.8710	.8716	.8722	.8727	.8733	.8739	.8745
7.5	.8751	.8756	.8762	.8768	.8774	.8779	.8785	.8791	.8797	.8802
7.6	.8808	.8814	.8820	.8825	.8831	.8837	.8842	.8848	.8854	.8859
7.7	.8865	.8871	.8876	.8882	.8887	.8893	.8899	.8904	.8910	.8915
7.8	.8921	.8927	.8932	.8938	.8943	.8949	.8954	.8960	.8965	.8971
7.9	.8976	.8982	.8987	.8993	.8998	.9004	.9009	.9015	.9020	.9025
8.0	.9031	.9036	.9042	.9047	.9053	.9058	.9063	.9069	.9074	.9079
8.1	.9085	.9090	.9096	.9101	.9106	.9112	.9117	.9122	.9128	.9133
8.2	.9138	.9143	.9149	.9154	.9159	.9165	.9170	.9175	.9180	.9186
8.3	.9191	.9196	.9201	.9206	.9212	.9217	.9222	.9227	.9232	.9238
8.4	.9243	.9248	.9253	.9258	.9263	.9269	.9274	.9279	.9284	.9289
8.5	.9294	.9299	.9304	.9309	.9315	.9320	.9325	.9330	.9335	.9340
8.6	.9345	.9350	.9355	.9360	.9365	.9370	.9375	.9380	.9385	.9390
8.7	.9395	.9400	.9405	.9410	.9415	.9420	.9425	.9430	.9435	.9440
8.8	.9445	.9450	.9455	.9460	.9465	.9469	.9474	.9479	.9484	.9489
8.9	.9494	.9499	.9504	.9509	.9513	.9518	.9523	.9528	.9533	.9538
9.0	.9542	.9547	.9552	.9557	.9562	.9566	.9571	.9576	.9581	.9586
9.1	.9590	.9595	.9600	.9605	.9609	.9614	.9619	.9624	.9628	.9633
9.2	.9638	.9643	.9647	.9652	.9657	.9661	.9666	.9671	.9675	.9680
9.3	.9685	.9689	.9694	.9699	.9703	.9708	.9713	.9717	.9722	.9727
9.4	.9731	.9736	.9741	.9745	.9750	.9754	.9759	.9763	.9768	.9773
9.5	.9777	.9782	.9786	.9791	.9795	.9800	.9805	.9809	.9814	.9818
9.6	.9823	.9827	.9832	.9836	.9841	.9845	.9850	.9854	.9859	.9863
9.7	.9868	.9872	.9877	.9881	.9886	.9890	.9894	.9899	.9903	.9908
9.8	.9912	.9917	.9921	.9926	.9930	.9934	.9939	.9943	.9948	.9952
9.9	.9956	.9961	.9965	.9969	.9974	.9978	.9983	.9987	.9991	.9996

次の常用対数表より、 $\log_{10}1.13 = 0.0531$  であることがわかる。

数	0	1	2	3	4
1.0	.0000	.0043	.0086	.0128	.0170
1.1	.0414	.0453	.0492	.0531	.0569
1.2	.0792	.0828	.0864	.0899	.0934
1.3	.1139	.1173	.1206	.1239	.1271
1.4	.1461	.1492	.1523	.1553	.1584

例1 次の値を常用対数表を用いて、小数第4位まで求めなさい。

- (1)  $\log_{10}2$     (2)  $\log_{10}1.22$     (3)  $\log_{10}1.43$

(1)  $\log_{10}2$  の値

数	0	1	2	3	4
1.0	.0000	.0043	.0086	.0128	.0170
1.1	.0414	.0453	.0492	.0531	.0569
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1.8	.2553	.2577	.2601	.2625	.2648
1.9	.2788	.2810	.2833	.2856	.2878
2.0	.3010	.3032	.3054	.3075	.3096
2.1	.3222	.3243	.3263	.3284	.3304

$\log_{10}2 = 0.3010$

(2)  $\log_{10}1.22$  の値

数	0	1	2	3	4
1.0	.0000	.0043	.0086	.0128	.0170
1.1	.0414	.0453	.0492	.0531	.0569
1.2	.0792	.0828	.0864	.0899	.0934
1.3	.1139	.1173	.1206	.1239	.1271
1.4	.1461	.1492	.1523	.1553	.1584

$\log_{10}1.22 = 0.0864$  (近似値)  $\Rightarrow$  次の頁で使います。

(3)  $\log_{10}1.43$  の値

数	0	1	2	3	4
1.0	.0000	.0043	.0086	.0128	.0170
1.1	.0414	.0453	.0492	.0531	.0569
1.2	.0792	.0828	.0864	.0899	.0934
1.3	.1139	.1173	.1206	.1239	.1271
1.4	.1461	.1492	.1523	.1553	.1584

$\log_{10}1.43 = 0.1553$  (近似値)  $\Rightarrow$  次の頁で使います。

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常用対数表にない数の常用対数の値の求め方

**例2** 常用対数表にない数の常用対数を求めてみよう。

(1)  $\log_{10}122$  の値

$122 = 1.22 \times 10^2$  とすれば, 1.22 の常用対数の値は常用対数表から読みとれる!

したがって,

$$\begin{aligned} \log_{10}122 &= \log_{10}(1.22 \times 10^2) \\ &= \log_{10}1.22 + \log_{10}10^2 \quad \longleftarrow \log_{10}10^2 = 2\log_{10}10 = 2 \\ &= \underline{0.0864} + 2 \\ &= 2.0864 \end{aligned}$$

前頁で常用対数表から読みとった値です。

(2)  $\log_{10}0.143$  の値

$0.143 = 1.43 \times 10^{-1}$  とすれば, 1.43 の常用対数の値は常用対数表から読みとれる!

したがって,

$$\begin{aligned} \log_{10}0.143 &= \log_{10}(1.43 \times 10^{-1}) \\ &= \log_{10}1.43 + \log_{10}10^{-1} \quad \longleftarrow \log_{10}10^{-1} = -\log_{10}10 = -1 \\ &= \underline{0.1553} - 1 \\ &= -0.8447 \end{aligned}$$

前頁で常用対数表から読みとった値です。

**問** 次の値を常用対数表を用いて, 小数第4位まで求めなさい。

- (1)  $\log_{10}429$       (2)  $\log_{10}0.0563$

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(1)  $\log_{10}429 = \log_{10}(4.29 \times 10^2)$

$= \log_{10}4.29 + \log_{10}10^2$

$= 2\log_{10}10 + \log_{10}4.29$

$= 2 + 0.6325$

$= 2.6325$

(2)  $\log_{10}0.0563 = \log_{10}(5.63 \times 10^{-2})$

$= \log_{10}5.63 + \log_{10}10^{-2}$

$= \log_{10}5.63 - 2\log_{10}10$

$= -2 + 0.7505$

$= -1.2495$

**戻り**