Department of Education, Sabaragamuwa Province/ Weekly School Department of Education, Sabaragamuwa Province/ Weekly School

Grade 10<u></u>-Lesson 19 - Logarithm

Laws of indices

- When multiplying powers with same base the indices are added. example - a³ × a² = a⁵
- When dividing powers with same base the indices are subtracted Example - a⁵ ÷ a² = a³
- In power of a power indices are multiplied Example- (a³)² = a⁶
- > The reciprocal is taken when converting negative indices to positive indices and positive indices to negative indices.
 - Example $i)\frac{1}{a^{-2}} = a^2$, $ii)a^3 = \frac{1}{a^{-3}}$
- > The value of zero index to any base is $1 a^0 = 1$

Solve review exercise in page no 1 and 2 in Mathematics Part II

Logarithms

- ➢ Writing in logarithm form when given in index form
 Example $2^3 = 8 \rightarrow \log_2 8 = 3$
- > Writing in index form when given in logarithm form Example - $\log_3 81 = 4 \rightarrow 3^4 = 81$

Solve 19.1exercise in page no 4 in Mathematics Part II

Lows of logarithms

$$\log_{a}(MN) = \log_{a} M + \log_{a} N$$
$$\log_{a}\left(\frac{M}{N}\right) = \log_{a} M - \log_{a} N$$

Example

- I. $\log_2 5 + \log_2 8 = \log_2(5 \times 8) = \log_2 40$
- II. $\log_a 8 + \log_a 6 \log_a 2 = \log_a \left(\frac{8 \times 6}{2}\right) = \log_a 24$
- III. $\log_{10} 250 + \log_{10} 8 \log_{10} 2 = \log_{10} \left(\frac{250 \times 8}{2}\right) = \log_{10} 1003$

Solve 19.2 exercise in page no 8 in your exercise book

Grade 10-Lesson 20-Logarithm II

As logarithm table is made using base 10 it is written as below

• log₁₀ N written as lg₁₀ N



	0	1	2	3	4	5	6	7	8	9	} සංඛාාවේ දෙවන දශමස්ථානය
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	100
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	1. A.
1					1						

I.lg 1.2 = 0.0792

II.log $_{10}$ 1.57 = 0.1959

Do the 20.1 exercise on page no 12 in the Mathematics Part II

> Logarithm of a number with four digits

			• _							9	මධා අන්තර නීරුව								
	. 0	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	9
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14.	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	1]	13	16	18	20
20	3010	3032	3054	3075	3096	3118	31.39	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18

Example

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lg 1.932 = 0.2860 \rightarrow (2856 + 4 = 2860)
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It is taken the answer by adding the value of the mean difference of the second column to the value of the 19^{th} row and 3^{rd} column.

When finding the logarithm of a number greater than 10 the given number is written as a number between 1-10. The number written between 1-10 is taken as the whole number part and the find the logarithm.

Example I. lg21.12=1.3247 II. lg1854=3.2681

Do the exercise 20.2, 20.3 in your exercise book.

Antilog

Exampe I. lg 1.39 = 0.1430

Antilog 0.1430 = 1.39 antilog 2.5514 = 356

Do the exercise 20.4 in your text book

Simplyfying the numbers using the logarithm table.

Example: Find the value of -
$$\frac{29.3 \times 6.285}{12.34}$$

lg $(\frac{29.3 \times 6.285}{12.34}) = lg(29.3 \times 6.825) - lg12.34$
 $= lg29.3 + lg 6.285 - lg 12.34$
 $= 1.4669 + 0.7983 + 1.0913$
 $= 1.1739$
 $\frac{29.3 \times 6.285}{12.34} = antilog = 1.1739 = 14.92$

Do the exercises 20.5,20.6 and miscellaneous exercise