Math
Notes

By me (Thanks to for the template SirCharlieMars)

Contents

Chapter 1

1.1 Indices

Definition 1.1.1: Index Laws

1. $a^m \times a^n = a^{n+m}$
2. $a^m \div a^n = a^{n-m}$
3. $(a^m)^n = a^{m \times n}$
4. $a^{-m} = \frac{1}{a^m}$
5. $a^0 = 1$
6. $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

Example 1.1.1 (Laws In Action)

1. $2^3 \times 2^7 = 2^{10}$
2. $\frac{3^6}{3^2} = 3^4$
3. $(5^2)^5 = 5^{10}$
4. $7 \times 2^{-2} = \frac{7}{2^2}$
5. $45^0 = 1$
6. $5^{\frac{-3}{7}} = \frac{1}{\sqrt[7]{5^3}}$

Note:-

Indices are used extremely frequently and there are often multiple laws hidden in each question

1.2 Logarithms (logs)

Definition 1.2.1: Principle

The general equation is:

$$log_{(a)}(y) = x \leftrightarrow a^x = y$$

For example:

$$log_{10}1 = 0 \leftrightarrow 10^0 = 1$$

Definition 1.2.2: Laws

1. $\log_{(a)}(x) + \log_{(a)}(y) = \log_{(a)}(xy)$
2. $\log_{(a)}(x) - \log_{a}(y) = \log_{(a)}(\frac{x}{y})$
3. $\log_{(a)}(x^n) = n \log_{(a)}(x)$
4. $\log_{(a)}(a) = 1$
5. $\log_{(a)}(1) = 0$

To use these laws, the bases must be the same a

Example 1.2.1 (Laws In Action)

Round to two decimal place

1. $\log_2 2 + \log_2 5 = \log_2 10 = 3.32$
2. $\log_5 12 - \log_5 2 = \log_5 6 = 1.11$
3. $\log_7 2^2 = 2 \times \log_7 2 = 0.71$
4. $\log_{84} 84 = 1$
5. $\log_{153} 1 = 0$

Note:-

some calculators have a default log base of 10