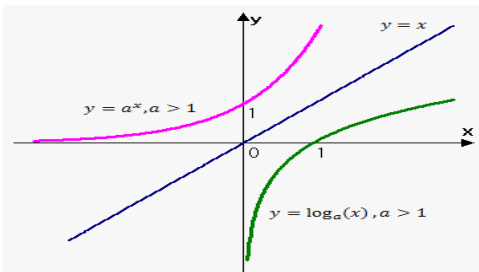


Goals

This week:

- Review index laws and exponential functions
- Define logarithms definition and learn their algebraic properties
- Sketch logarithmic functions



Theoretical Components

STEP 1

Resources:

- Maths Quest Year 12 Chapter 7
- Maths Quest B Year 12 for Qld Chapter 3

Index laws

- $a^x \times a^y = a^{x+y}$
- $a^x \div a^y = a^{x-y}$
- $(a^x)^y = a^{xy}$
- $a^0 = 1$
- $a^{-x} = \frac{1}{a^x}$ and $\frac{1}{a^{-x}} = a^x$
- $a^{\frac{1}{y}} = \sqrt[y]{a}$ and $a^{\frac{x}{y}} = \sqrt[y]{a^x}$
- $a^x = y \Leftrightarrow \log_a y = x$

Logarithm laws

- $\log_a 1 = 0$
- $\log_a a = 1$
- $\log_a 0$ is undefined
- $\log_a mn = \log_a m + \log_a n$
- $\log_a \frac{m}{n} = \log_a m - \log_a n$
- $\log_a m^p = p \log_a m$
- $\log_b N = \frac{\log_a N}{\log_a b}$ (change-of-base rule)

Lesson on Applications of Logarithmic Functions

<https://mathspace.co/teach2/chapter/39045/1082/>

Practical Components

STEP 2

Do **Exercise 3A and 3B** (handout)

On www.mathspace.co there are two custom tasks for you to complete.

1. Change of Base
2. Logarithmic Graph

Investigation

STEP 3

Complete www.mathspace.co task:

Domain and Range of Logarithmic Functions



QFO

Quiz/Forum/Other

Remember to scan in when you come to the Maths Area and when you leave.

Instructions?.....

(A) $3^x = 81$	(B) $x^5 = 50$
(C) $3^x = 43$	(D) $5^{2x} - 5^x - 6 = 0$
(E) $5^x + 4^x = 8$	(F) $5^x + 2 \times 5^{1-x} = 7$
(G) $3^{2x} - 3 = 24$	(H) $2^{2x} - 9 \times 2^x + 8 = 0$
(I) $\sqrt{2x-3} = 5$	(J) $5^x - x^5 = 3$
(K) $16^{\frac{3}{x}} = 8$	(L) $\left(\frac{13}{16}\right)^{3x} = \frac{3}{4}$