

The definions of $x^{n}$

- Whole numbers $\quad x^{4}=x \cdot x \cdot x \cdot x$
- get rubs for wok number exponents $x^{n} X^{m}=x^{a+m}$
- use rules to extend definition
of $x^{n}$ to $n=0, n$ negative integer
- fractional exponents
- real exponent?


## n $f(n)=2^{n}$ <br> 



| 1. $\log _{2}(A B)=\log _{2} A+\log _{2} B$ | 2. $\log _{2} 1=0$ |
| :--- | :--- |
| 3. $\log _{2}\left(A^{p}\right)=p \log _{2} A$ | 2. $\log _{2}\left(2^{x}\right)=x$ |
| 6. $\log _{2}(1 / x)=-\log _{2} x$ |  |

Definition

The logarithm (to base 2) of $n$ is the exponent that you raise 2 to to get $n$.

In symbols:

$$
\begin{array}{ll}
\log _{2} n=p \text { if and only if } & 2^{p}=n . \\
\log \left(m^{n}\right)=n \log (m) & \log _{a}(b)=\frac{\log (b)}{\log (a)} \\
\log \left(\frac{m}{n}\right)=\log (m)-\log (n) & \log \left(10^{x}\right)=x \\
\log (m n)=\log (m)+\log (n) &
\end{array}
$$

$$
\begin{aligned}
2^{\operatorname{lom}_{4}(A B)} & =A B \\
\log _{2}(A B) & =\left(\log _{2} A+\log _{2} B\right)
\end{aligned}
$$

exp ales $2^{\left(\log _{2} A, \log _{2} B\right)}=$

$$
\begin{aligned}
\operatorname{de} \text { simon }{ }^{\log _{c} t \lambda} 2^{\log B} & = \\
A \cdot B & =A B
\end{aligned}
$$

