1-5 Exponential Functions

師大工教一

Definition: Function $f(x) = a^x, a > 0$, is the exponential function with base a.

指數

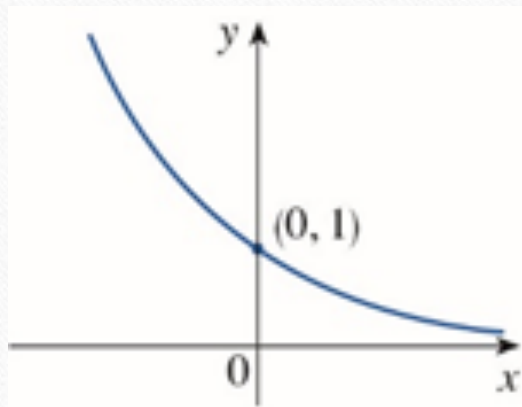以a為底

Recall: $n \in \mathbb{N}, a^n = a \cdot a \cdots \cdot a$
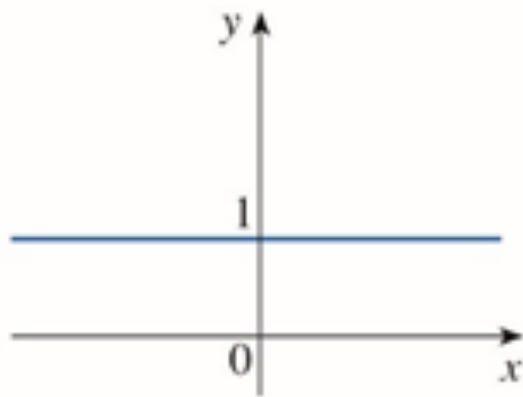
$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

$$a^{\frac{1}{n}} = \sqrt[n]{a}, a^{\frac{p}{q}} = \sqrt[q]{a^p}$$

$$\sqrt{3} = 1.732\,050808\cdots, 2^1, 2^{1.7}, 2^{1.73}, 2^{1.732}, 2^{1.7320}, 2^{1.73205}, \cdots \rightarrow 2^{\sqrt{3}}$$
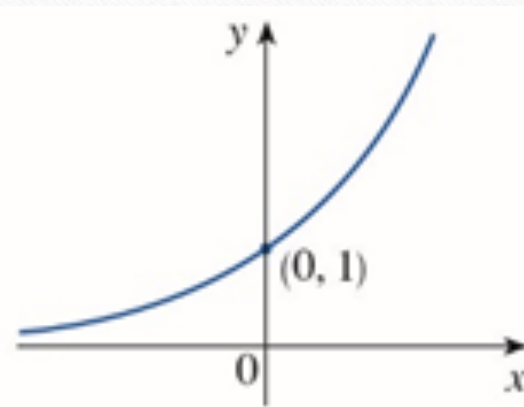
$0 < a < 1$
$y = a^x$

$a = 1$
$y = a^x$

$a > 1$
$y = a^x$

※Laws of Exponents(p35)

指數律

$a, b > 0$ and $x, y \in \mathbb{R}$

1. $b^x \cdot b^y = b^{x+y}$

2. $\dfrac{b^x}{b^y} = b^{x-y}$

3. $\left(b^x\right)^y = b^{xy}$

4. $a^x \cdot b^x = (ab)^x$

※The Natural Exponential Function(p54)

e：尤拉數

$y = e^x = \exp(x)$, where e is an irrational number, $e = 2.718281828\cdots$

HW1-5

- **No HW**