

3.3 LOGARITHM

○ The General Form

$${}_a\log b = c \quad , \quad a > 0, a \neq 1 \text{ \& } b > 0$$

$${}_a\log b = c \quad \longleftrightarrow \quad b = a^c$$

Example:

$${}_2\log 8 = 3 \quad \longleftrightarrow \quad 8 = 2^3$$

$${}_3\log 81 = x \quad \longleftrightarrow \quad 81 = 3^x$$

$$3^4 = 3^x$$

$$x = 4$$



○ The Properties of Logarithm

$$1) \quad {}^a\log a = 1$$

$$2) \quad {}^a\log 1 = 0$$

$$3) \quad {}^a\log (b \times c) = {}^a\log b + {}^a\log c$$

$$4) \quad {}^a\log \left(\frac{b}{c} \right) = {}^a\log b - {}^a\log c$$

$$5) \quad {}^a\log (b)^n = n \times {}^a\log b$$

$$6) \quad {}^a\log b = \frac{1}{{}^b\log a}$$



$$7) \quad {}^a\log b = \frac{{}^c\log b}{{}^c\log a}$$

$$8) \quad {}^a\log b \times {}^b\log c = {}^a\log c$$

$$9) \quad {}^{a^m}\log (b)^n = \frac{n}{m} \times {}^a\log b$$

$$10) \quad (a)^{{}^a\log b} = b$$

