Inequalities

$$x < y$$

$$x + 2 < y + 2 \qquad 2x < 2y \qquad -2x > -2y$$

$$x - 2 < y - 2 \qquad \frac{x}{2} < \frac{y}{2} \qquad \frac{x}{-2} > \frac{y}{-2}$$

Algebraic Rules for Exponentials and Logarithms

① $a^x a^y = a^{x+y}$

$a^2 a^1 = (a \cdot a) a$

$\quad = a \cdot a \cdot a$

$\quad = a^3$

② $\dfrac{a^x}{a^y} = a^{x-y}$

$\dfrac{a^5}{a^2} = \dfrac{a \cdot a \cdot a \cdot a \cdot a}{a \cdot a}$

$\quad = a \cdot a \cdot a$

$\quad = a^3$

③ $(a^x)^y = a^{xy}$

$(a^2)^3 = (a^2)(a^2)(a^2)$

$\quad = a \cdot a \cdot a \cdot a \cdot a \cdot a$

$\quad = a^6$

① $\log_a(x) + \log_a(y) = \log_a(xy)$

② $\log_a(x) - \log_a(y) = \log_a\left(\frac{x}{y}\right)$

③ $\log_a(x^z) = z\log_a(x)$

$\log_a(3^2) = \log_a(3 \cdot 3) = \log_a(3) + \log_a(3) = 2\log_a(3)$