លិខិតកំណត់សំគាល់ខាត់ៗ

9. ទ្រីនោលទាវុឌ (Trigonometry)

9.
$$\lim_{x \to 0} \frac{\sin x}{x} = \lim_{x \to 0} \frac{x}{\sin x} = 1$$
 $\exists \lim_{x \to 0} \frac{1 - \cos x}{x} = 0$

$$\lim_{x\to 0}\frac{1-\cos x}{x}=0$$

$$\mathfrak{m}. \qquad \lim_{x \to 0} \frac{\sin(u(x))}{u(x)} = 1$$

$$\mathfrak{M}. \qquad \lim_{x \to 0} \frac{\sin(u(x))}{u(x)} = 1 \qquad \mathfrak{C}. \qquad \left(\lim_{x \to 0} \frac{1 - \cos(u(x))}{u(x)}\right) = 0$$

អ៊ីខស្យ៉ូលាខ់ស្យែល(Exponential)

9.
$$\lim_{x\to -\infty} e^x = 0$$

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$$\forall . \qquad \lim_{x \to +\infty} e^x = +\infty$$

$$\mathbf{m}. \qquad \lim_{x \to +\infty} \frac{x}{e^x} = 0$$

$$\lim_{x \to +\infty} \frac{x}{e^x} = 0 \qquad \qquad \text{if} \quad \lim_{x \to +\infty} \frac{x}{e^x} = 0 \quad (n > 0)$$

$$\lim_{x \to +\infty} \frac{e^x}{x} = +\infty$$

$$\lim_{x\to 0}\frac{e^x-1}{x}=1$$

$$\iint_{x \to 0} \frac{e^{x} - 1}{x} = 1 \qquad \qquad \iint_{x \to 0} \frac{e^{u(x)} - 1}{u(x)} = 1 \qquad \qquad \iint_{x \to 0} \frac{e^{u(x)} - 1}{u(x)} = 1$$

$$\lim_{x\to 0} (1+x)^{\frac{1}{x}} = e^{-\frac{1}{x}}$$

8.
$$\lim_{x\to 0} (1+x)^{\frac{1}{x}} = e$$
 90. $\lim_{x\to 0} [1+u(x)]^{\frac{1}{u(x)}} = e$

99.
$$\lim_{x \to \pm \infty} \left(1 + \frac{1}{x} \right)^x = e$$
 90.
$$\lim_{x \to \pm \infty} \left[1 + \frac{1}{u(x)} \right]^{u(x)} = e$$

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$$9\,\mathrm{m.}\quad \lim_{x\to -\infty}xe^x=0$$

លេះ (Logarithm)

$$9. \qquad \lim_{x \to 0^+} \ln x = -\infty$$

$$\lim_{x \to +\infty} \ln x = +\infty$$

$$\mathfrak{m}. \qquad \lim_{x \to +\infty} \frac{\ln x}{x} = 0$$

$$\lim_{x \to +\infty} \frac{\ln x}{x^n} = 0 \ (n > 0)$$

$$\lim_{x \to +\infty} \frac{x}{\ln x} = +\infty$$

$$\lim_{x \to +\infty} \frac{x^n}{\ln x} = +\infty \ (n > 0)$$

$$\mathfrak{I} \int_{x\to 0^+} x \ln x = 0$$

$$\mathbf{G}. \qquad \lim_{x \to 0^+} x^n \ln x = 0 \quad (n > 0)$$

លីទីតភ័ណត់សំគាល់ខាន់ៗ

9. ត្រីនោលទាវុគ (Trigonometry)

$$\lim_{x\to 0}\frac{1-\cos x}{x}=0$$

$$\mathfrak{m}. \qquad \lim_{x \to 0} \frac{\sin(u(x))}{u(x)} = 1 \qquad \mathfrak{C}. \qquad \left(\lim_{x \to 0} \frac{1 - \cos(u(x))}{u(x)}\right) = 0$$

$$\left(\lim_{x\to 0}\frac{1-\cos(u(x))}{u(x)}\right) = 0$$

នុំខស្យ័ណ១ខំស្បែស(Exponential) **U**.

$$9. \qquad \lim_{x \to -\infty} e^x = 0$$

$$\mathfrak{M}. \qquad \lim_{x \to +\infty} \frac{x}{e^x} = 0$$

$$\mathfrak{M}. \qquad \lim_{x \to +\infty} \frac{x}{e^x} = 0 \qquad \qquad \mathfrak{C}. \qquad \lim_{x \to +\infty} \frac{x^n}{e^x} = 0 \left(n > 0 \right)$$

$$\lim_{x \to +\infty} \frac{e^x}{x} = +\infty$$

$$\lim_{x \to +\infty} \frac{e^x}{x^n} = +\infty (n > 0)$$

$$\mathfrak{n}. \qquad \lim_{x\to 0}\frac{e^x-1}{x}=1$$

$$\mathbf{G}. \qquad \lim_{x \to 0} \frac{e^{u(x)} - 1}{u(x)} = 1$$

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$$\lim_{x\to 0} (1+x)^{\frac{1}{x}} = e$$

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$$\lim_{x \to \pm \infty} \left(1 + \frac{1}{x} \right)^x = e$$
 90.
$$\lim_{x \to \pm \infty} \left[1 + \frac{1}{u(x)} \right]^{u(x)} = e$$

$$\lim_{x\to\pm\infty} 1+$$

$$\lim_{x\to\pm\infty} \left[1+\frac{1}{u(x)}\right]$$

$$9\,\mathfrak{m}.\quad \lim_{x\to-\infty}xe^x=0$$

លោភា៖អនេះំព (Logarithm) m.

$$9. \qquad \lim_{x \to 0^+} \ln x = -\infty$$

$$\lim_{x \to +\infty} \ln x = +\infty$$

$$\mathfrak{m}. \qquad \lim_{x \to +\infty} \frac{\ln x}{x} = 0$$

$$\mathfrak{M}. \qquad \lim_{x \to +\infty} \frac{\ln x}{x} = 0 \qquad \qquad \mathfrak{C}. \qquad \lim_{x \to +\infty} \frac{\ln x}{x^n} = 0 \ (n > 0)$$

$$\lim_{x \to +\infty} \frac{x}{\ln x} = +\infty$$

$$\lim_{x \to +\infty} \frac{x^n}{\ln x} = +\infty \ (n > 0)$$

$$\mathfrak{I} \lim_{x \to 0^+} x \ln x = 0$$

$$\mathbf{G}. \qquad \lim_{x \to 0^+} x^n \ln x = 0 \ (n > 0)$$