

Ex 2 :

$$1. \lim_{x \rightarrow +\infty} \left( x^2 + \frac{2}{x} \right) = +\infty + 0 = +\infty$$

$$\lim_{x \rightarrow +\infty} (2x + \ln x) = +\infty + \infty = +\infty$$

$$2. \lim_{x \rightarrow +\infty} (2x + e^x) = +\infty + \infty = +\infty$$

$$\lim_{\substack{x \rightarrow 0 \\ x > 0}} \frac{e^x}{x} = \frac{e^0}{0} = \frac{1}{0} = +\infty$$

$$3. \lim_{x \rightarrow +\infty} \frac{1}{e^x + 1} = \frac{1}{+\infty + 1} = \frac{1}{+\infty} = 0$$

$$\lim_{x \rightarrow +\infty} 3e^{-2x} = 3e^{-\infty} = 3 \times 0 = 0$$

$$4. \lim_{x \rightarrow 1} x^2 e^x = 1^2 \times e^1 = 1 \times e = e$$

$$\lim_{x \rightarrow 1} 2x^3 \ln x = 2 \times 1^3 \times \ln 1 = 0$$

$$5. \lim_{x \rightarrow +\infty} \ln(x-2) = \ln(+\infty) = +\infty$$

$$\lim_{\substack{x \rightarrow 2 \\ x > 2}} \ln(x-2) = \ln(2-2) = \ln(0) = -\infty$$

$$6. \lim_{x \rightarrow +\infty} 2e^{x+1} = 2 \times e^{+\infty} = +\infty$$

$$\lim_{x \rightarrow -\infty} e^{1-x} = e^{1-(-\infty)} = e^{1+\infty} = e^{+\infty} = +\infty$$

$$7. \lim_{x \rightarrow +\infty} x^2 \ln x = (+\infty) \times (+\infty) = +\infty$$

$$\begin{aligned} \lim_{x \rightarrow -\infty} (x+1)e^{-x} &= (-\infty) \times e^{-(-\infty)} = \\ &= -\infty \times e^{+\infty} = -\infty \end{aligned}$$

$$8. \lim_{x \rightarrow 0} (e^x + e^{-x}) = e^0 + e^0 = 1 + 1 = 2$$

$$\lim_{x \rightarrow -\infty} e^{1/x} = e^{\frac{1}{-\infty}} = e^0 = 1$$

$$9. \lim_{x \rightarrow +\infty} \left( 2x + \frac{\ln x}{x} \right) = +\infty + 0 = +\infty$$

$$\lim_{x \rightarrow +\infty} \left( 1 + \frac{e^x}{x^2} \right) = 1 + \lim_{x \rightarrow +\infty} e^x = +\infty$$