

CALCULUS

① $f(x) = 4x^7 - 18x^3 + 9$

Solution.

$$\lim_{x \rightarrow \infty} (4x^7 - 18x^3 + 9)$$

$$\lim_{x \rightarrow \infty} 4x^7 - \lim_{x \rightarrow \infty} 18x^3 + \lim_{x \rightarrow \infty} 9$$

$$= \infty - \infty + 9$$

$$= \underline{\underline{\infty}}$$

② $h(t) = \sqrt[3]{t} + 12t - 2t^2$

$$= \lim_{t \rightarrow \infty} \frac{1}{t^3} + \lim_{t \rightarrow \infty} 12t - \lim_{t \rightarrow \infty} 2t^2$$

$$= 0 + \infty - \infty$$

$$= \underline{\underline{\infty}}$$

③ $f(x) = \frac{8-4x^2}{9x^2+5x} = \lim_{x \rightarrow \infty} \frac{\frac{8}{x^2} - \frac{4}{x^2}}{\frac{9x^2}{x^2} + \frac{5x}{x^2}}$

$$= \lim_{x \rightarrow \infty} \frac{8}{x^2} - \lim_{x \rightarrow \infty} 4$$

$$\frac{\lim_{x \rightarrow \infty} 8}{\lim_{x \rightarrow \infty} 9} + \lim_{x \rightarrow \infty} \frac{5}{x}$$

$$= \frac{0-4}{9+0}$$

$$= \underline{\underline{-\frac{4}{9}}}$$

$$\textcircled{4} \quad f(x) = \frac{3x^7 - 4x^2 + 1}{5 - 10x^2}$$

$$\lim_{x \rightarrow \infty} \frac{3x^7}{x^2} - \lim_{x \rightarrow \infty} \frac{4x^2}{x^2} + \lim_{x \rightarrow \infty} \frac{1}{x^2}$$

$$\lim_{x \rightarrow \infty} \frac{5}{x^2} = \lim_{x \rightarrow \infty} 10$$

$$= \lim_{x \rightarrow \infty} 3x^5 - \lim_{x \rightarrow \infty} 4 + \lim_{x \rightarrow \infty} \frac{1}{x^2}$$

$$\lim_{x \rightarrow \infty} \frac{5}{x^2} - \lim_{x \rightarrow \infty} 10$$

$$= \frac{\infty - 4 + 0}{0 - 10} = \frac{\infty}{-10}$$

$$= \underline{\underline{\infty}}$$