

**Total time: 15 minutes.**

**Problem 1 (2 points each).** Determine limits.

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

$$(2) \quad \lim_{x \rightarrow 8} \frac{x - 8}{x^2 - 9x + 8} = \lim_{x \rightarrow 8} \frac{x - 8}{(x - 8)(x - 1)} = \lim_{x \rightarrow 8} \frac{1}{x - 1} = \frac{1}{7}$$

$$(3) \quad \lim_{x \rightarrow -\infty} \frac{x^3 + 2x - 1}{3x^2 + 2} = \lim_{x \rightarrow -\infty} \frac{x + \frac{2}{x} - \frac{1}{x^2}}{3 + \frac{2}{x^2}} = -\infty$$

$$(4) \quad \lim_{x \rightarrow \infty} \frac{x^2 - 2}{\sqrt{1 + 3x^4}} = \lim_{x \rightarrow \infty} \frac{1 - \frac{2}{x^2}}{\sqrt{\frac{1}{x^4} + 3}} = \frac{1}{\sqrt{3}}$$

$$(5) \quad \lim_{x \rightarrow \infty} \frac{e^x - 1}{e^{2x} + 2} = \frac{1 - e^{-x}}{e^x + 2e^{-x}} = 0$$