

問題 1

以下の極限值を計算せよ。

$$(1-1) \lim_{x \rightarrow 0} (2x + 1) = 1$$

$$(1-2) \lim_{x \rightarrow \infty} (2x + 1) = \infty$$

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

$$(1-4) \lim_{x \rightarrow \infty} (-2x + 1) = -\infty$$

$$(1-5) \lim_{x \rightarrow \infty} \frac{1}{x} = 0$$

$$(1-6) \lim_{x \rightarrow -\infty} \frac{1}{x} = 0$$

$$(1-7) \lim_{x \rightarrow 0} \frac{1}{x^2} = \infty$$

$$(1-8) \lim_{x \rightarrow \infty} \frac{3}{2x - 1} = \frac{3}{\infty} = 0$$

$$(1-9) \lim_{x \rightarrow 0} \frac{x}{x^2 + 1} = \frac{0}{0 + 1} = \frac{0}{1} = 0$$

$$(1-10) \lim_{x \rightarrow \infty} \frac{2x}{3x^2 + 1} = \lim_{x \rightarrow \infty} \frac{\frac{2}{x}}{3 + \frac{1}{x^2}} = \frac{0}{3 + 0} = \frac{0}{3} = 0$$

$$(1-11) \lim_{x \rightarrow \infty} \frac{2x^2}{3x^2 + 1} = \lim_{x \rightarrow \infty} \frac{2}{3 + \frac{1}{x^2}} = \frac{2}{3 + 0} = \frac{2}{3}$$

$$(1-12) \lim_{x \rightarrow \infty} \frac{2x^3}{3x^2 + 1} = \lim_{x \rightarrow \infty} \frac{2x}{3 + \frac{1}{x^2}} = \frac{\infty}{3 + 0} = \infty$$

$$(1-13) \lim_{x \rightarrow \infty} \frac{2x}{\sqrt{3x^2 + 1}} = \lim_{x \rightarrow \infty} \frac{2}{\sqrt{3 + \frac{1}{x^2}}} = \frac{2}{\sqrt{3 + 0}} = \frac{2}{\sqrt{3}}$$

$$(1-14) \lim_{x \rightarrow \infty} \frac{3^x - 2^x}{3^x + 2^x} = \lim_{x \rightarrow \infty} \frac{1 - \left(\frac{2}{3}\right)^x}{1 + \left(\frac{2}{3}\right)^x} = \frac{1 - 0}{1 + 0} = 1$$