

22. 関数の極限の計算

hm3-2-22

(pdf ファイル)



関数の極限值の性質

関数の極限值の基本性質

$x \rightarrow \alpha$ のとき, 関数 $f(x)$, $g(x)$ が収束するなら,

$$\text{I } \lim_{x \rightarrow \alpha} c f(x) = c \lim_{x \rightarrow \alpha} f(x) \quad (c \text{ は定数})$$

$$\text{II } \lim_{x \rightarrow \alpha} (f(x) + g(x)) = \lim_{x \rightarrow \alpha} f(x) + \lim_{x \rightarrow \alpha} g(x)$$

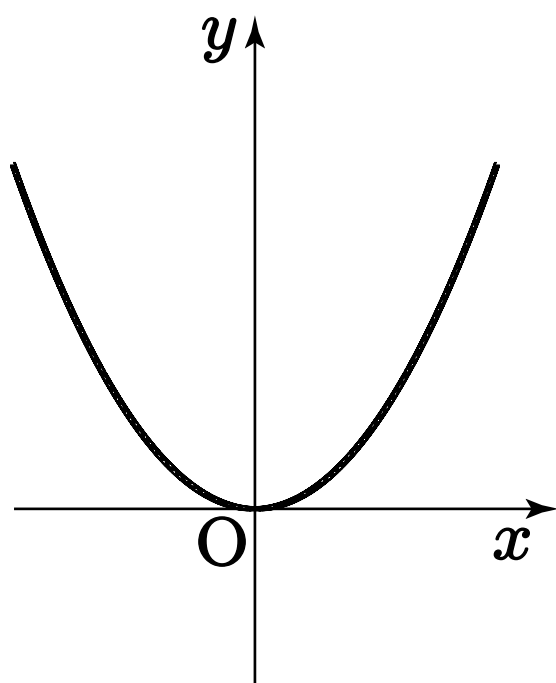
$$\text{III } \lim_{x \rightarrow \alpha} (f(x) - g(x)) = \lim_{x \rightarrow \alpha} f(x) - \lim_{x \rightarrow \alpha} g(x)$$

$$\text{IV } \lim_{x \rightarrow \alpha} f(x) g(x) = \lim_{x \rightarrow \alpha} f(x) \lim_{x \rightarrow \alpha} g(x)$$

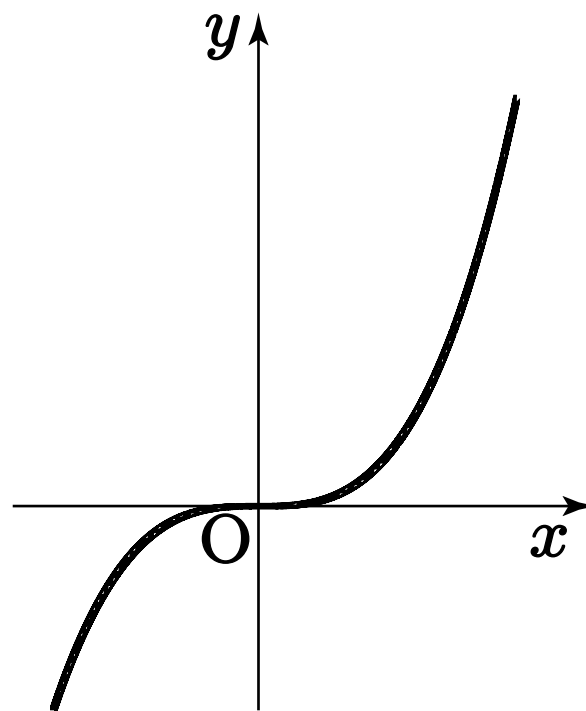
$$\text{V } \lim_{x \rightarrow \alpha} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow \alpha} f(x)}{\lim_{x \rightarrow \alpha} g(x)} \quad (\lim_{x \rightarrow \alpha} g(x) \neq 0)$$

極限值の計算の例(1)

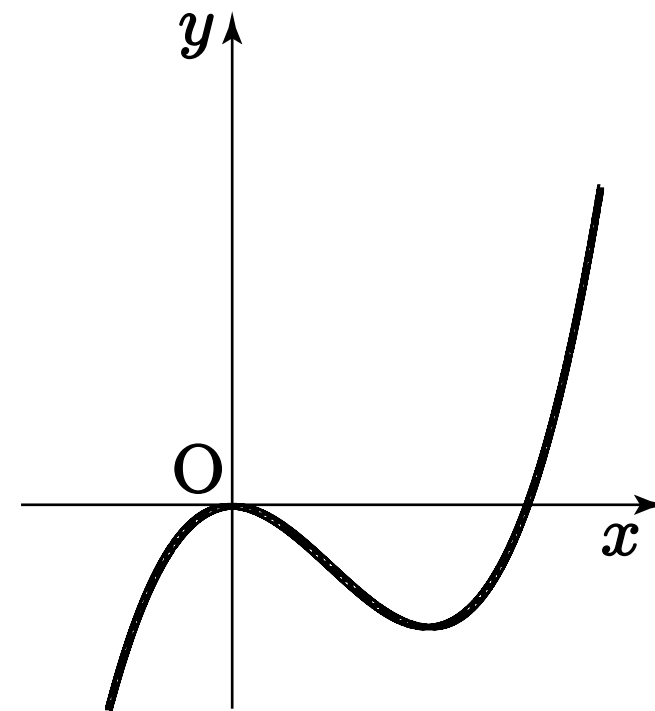
$$\lim_{x \rightarrow 1} (x^3 - 2x^2) = \lim_{x \rightarrow 1} x^3 - 2 \lim_{x \rightarrow 1} x^2$$
$$=$$



$$y = x^2$$



$$y = x^3$$



$$y = x^3 - 2x^2$$

極限值の計算の例(2)

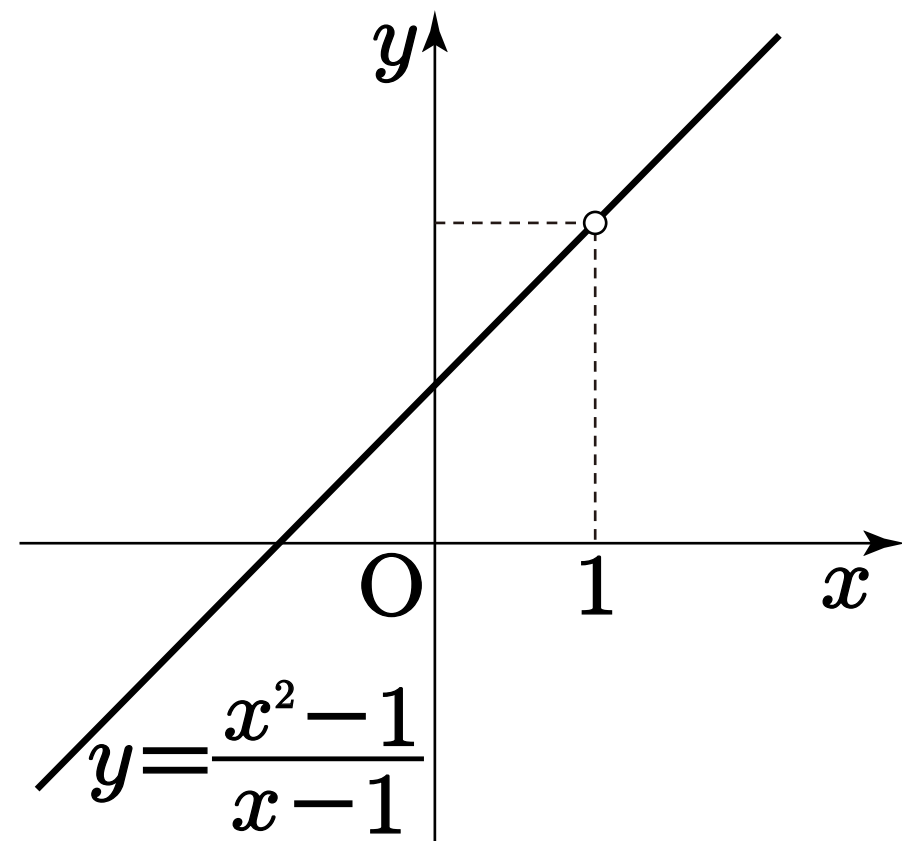
$x \neq 1$ のとき,

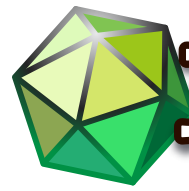
$$\frac{x^2 - 1}{x - 1} = \frac{\quad}{x - 1}$$
$$=$$

であるから,

$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

$$= \lim_{x \rightarrow 1}$$

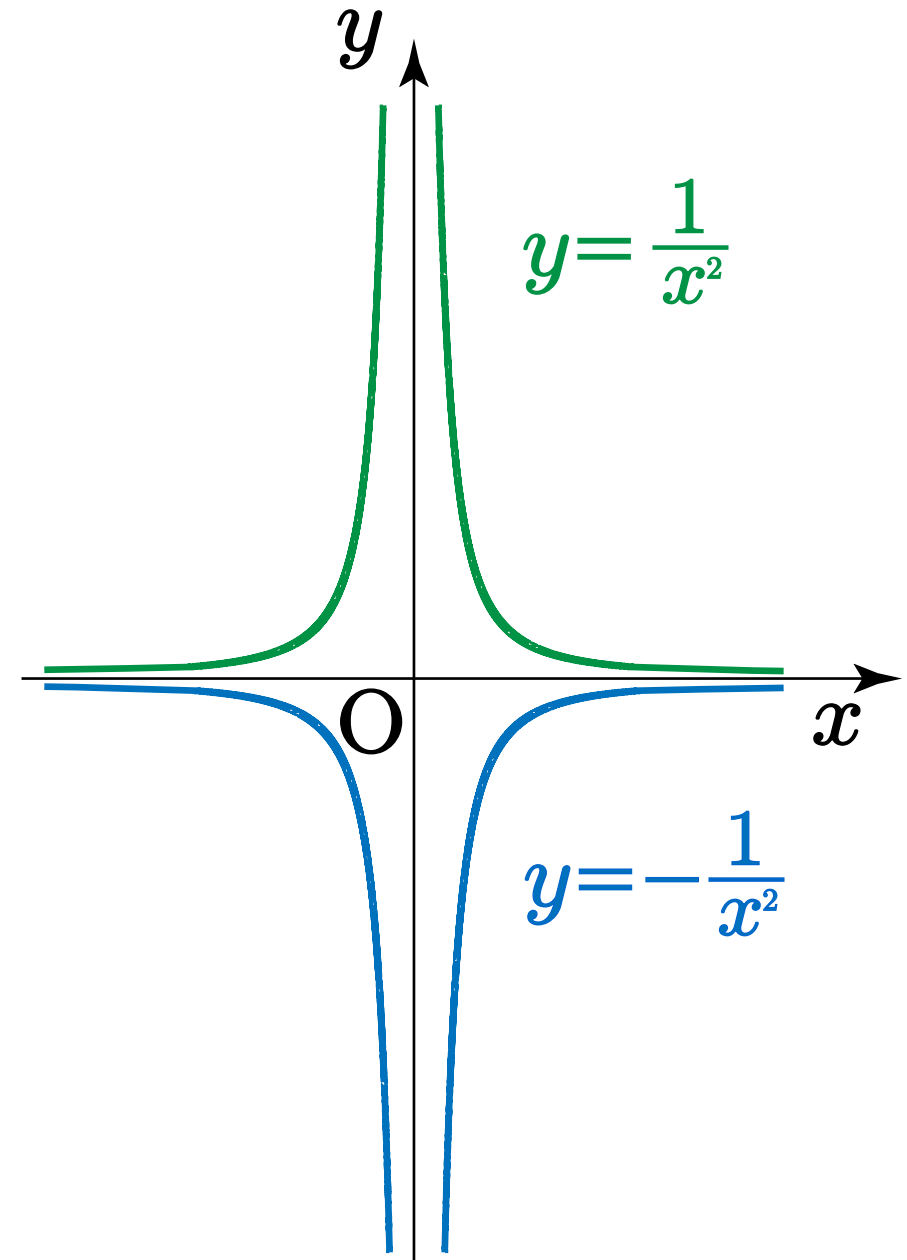




正負の無限大に発散する極限の例

■ $\lim_{x \rightarrow 0} \frac{1}{x^2} = \infty$

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



 $\frac{0}{0}$ の極限の計算例

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

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

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