

$$x \rightarrow 1 \quad \frac{1}{x^3 - 1}$$

$$x \rightarrow 1 \quad (x-1)(x^2+x+1)$$

② $\lim_{x \rightarrow 0} |x| \cos \frac{1}{x^2} \rightarrow \begin{cases} \lim_{x \rightarrow 0^+} |x| \cos \frac{1}{x^2} = x \\ \lim_{x \rightarrow 0^-} -|x| \cos \frac{1}{x^2} = -x \end{cases}$

2. $\lim_{x \rightarrow 3} (x-1)^2 = 4$

Def! -5

Given $\epsilon > 0$

There exists $\delta > 0$

$$0 < |(x-1)^2 - 4| < \epsilon$$

$$- \epsilon < (x-1)^2 - 4 < \epsilon$$

$$4 - \epsilon < (x-1)^2 < 4 + \epsilon$$

$$\sqrt{4 - \epsilon} < x - 1 < \sqrt{4 + \epsilon}$$

$$1 + \sqrt{4 - \epsilon} < x < 1 + \sqrt{4 + \epsilon}$$

$$-2 + \sqrt{4 - \epsilon} < x - 3 < -2 + \sqrt{4 + \epsilon}$$

Take $\delta = \min(-2 + \sqrt{4 - \epsilon}, -2 + \sqrt{4 + \epsilon})$

$$\Rightarrow \delta = |x - (-2 + \sqrt{4 - \epsilon})| = 2 - \sqrt{4 - \epsilon}$$

$$\Rightarrow 0 < |(x-1)^2 - 4| < 2 - \sqrt{4 - \epsilon}$$

3.

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