

$$\lim_{x \rightarrow 1} \frac{x^9 + x^8 + \dots + 1}{x^2 + x + 1} = \frac{10}{3}$$

$$\lim_{x \rightarrow 0} |x| \cos\left(\frac{1}{x^2}\right)$$

$$\hookrightarrow \lim_{x \rightarrow 0} |x| \cos\left(\frac{1}{x^2}\right) = 0 \cdot \cos \infty = 0.$$

and use it to show that

-3 given $\varepsilon > 0$, there exists $\delta > 0$ such that

$$0 < x - 3 < \delta \Rightarrow |(x-1)^2 - 4| < \varepsilon.$$

$$3 \leq x < \delta + 3$$