

$$\lim_{x \rightarrow \infty} \frac{5x^2 + x + 10}{4x^5 - 3x^4 - 2}$$

$$\lim_{x \rightarrow \infty} \frac{x^2 \left(5 + \frac{1}{x} + \frac{10}{x^2} \right)}{x^5 \left(4 - \frac{3}{x} - \frac{2}{x^5} \right)}$$

$$\lim_{x \rightarrow \infty} \frac{5x^2}{4x^5} = \frac{5}{4x^3} = 0$$

$$\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 - 5x + 4}$$

$$a(x - x_1)(x - x_2)$$

$$\Delta = 25 - 4(1)(4)$$

$$\Delta = 9$$

$$x = \frac{5 \pm 3}{2}$$

$$x_1 = 4$$

$$x_2 = 1$$

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

$$= \lim_{x \rightarrow 1} \frac{1+1+1}{-3} = -1$$

$$a^3 - b^3 = a^2 + ab + b^2$$

$$\begin{array}{r} x^3 + 0x^2 + 0x - 1 \\ \underline{+ x^3 + x^2} \\ x^2 + 0x - 1 \end{array} \quad \begin{array}{r} x-1 \\ \underline{x^2 + x + 1} \end{array} \quad \begin{array}{r} x \\ x^2 + x + 1 \end{array}$$

$$\begin{array}{r} x^2 + 0x - 1 \\ \underline{- x^2 + x} \\ -x - 1 \end{array}$$

$$\begin{array}{r} -x - 1 \\ \underline{-x + 1} \end{array}$$

+

$$\begin{array}{r} 10 \overline{) 4} \\ - 8 \\ \hline 2 \end{array}$$

Diagram showing the division of 10 by 2. The quotient is 4, and the remainder is 2. A curved arrow points from the 4 to the 'X' in the equation $10 = 2 \cdot 4 + 2$. A plus sign is written below the remainder 2.

$$10 = 2 \cdot 4 + 2$$

$$\lim_{x \rightarrow \infty} \frac{3x}{x^3 - x}$$

$$\lim_{x \rightarrow \infty} \frac{5x^2 + x + 10}{4x^5 - 3x^4 - 2}$$

$$= \lim_{x \rightarrow \infty} \frac{\cancel{x^5} \left(\frac{5}{\cancel{x^3}} + \frac{1}{\cancel{x^4}} + \frac{10}{\cancel{x^5}} \right)}{\cancel{x^5} \left(4 - \frac{3}{\cancel{x}} - \frac{2}{\cancel{x^5}} \right)}$$

$$= \lim_{x \rightarrow \infty} \frac{0}{4} = 0$$

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

$n \geq 1$

$$\lim_{x \rightarrow 0} \frac{3x}{x^3 - x^2} = 0$$

$$\lim_{x \rightarrow 0} \frac{3x}{x(x^2 - x)}$$

$$\lim_{x \rightarrow 0} \frac{3}{x^2 - x} = \infty$$

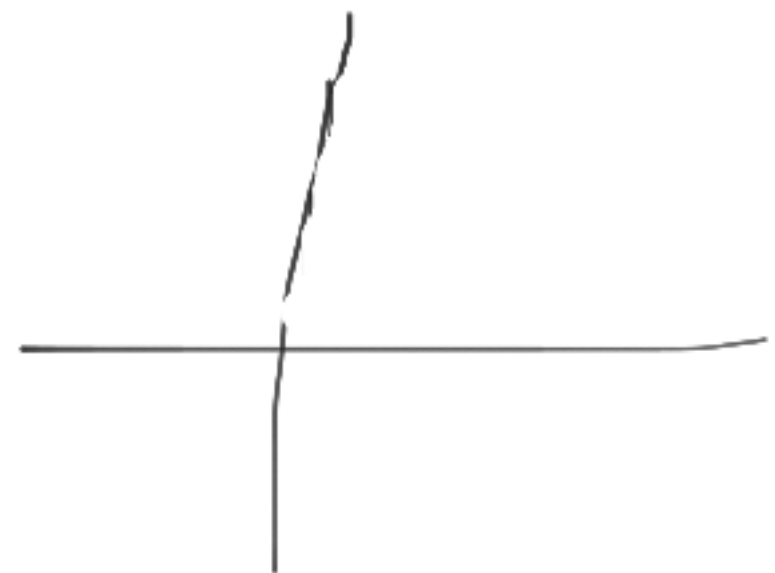
⊕ ~ +∞

$$\lim_{x \rightarrow 0^+} \frac{3}{\underbrace{x}_{\oplus} \underbrace{(x-1)}_{\ominus}} = -\infty$$



$$0,50 \times 0,5 = 0,25$$

$$0,5 > 0,25$$



$$\} \text{ , } = +\infty$$

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

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

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

$$= \lim_{x \rightarrow 0} \frac{0 - 0 + 3 - 2/x}{1}$$

$$\lim_{x \rightarrow 0} 3 - \frac{2}{x} =$$

$$\lim_{x \rightarrow 0^-} \frac{-2}{-} = +\infty$$

$$\lim_{x \rightarrow 0^+} \frac{-2}{+} = -\infty$$



$$\lim_{x \rightarrow 0} \frac{x^3 - 1 - \overbrace{3x(x-1)} - 1}{x}$$

$$= \lim_{x \rightarrow 0} \frac{x^3 - 3x^2 + 3x - 2}{x} \quad \begin{matrix} \div x \\ \div x \end{matrix}$$

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

$$\lim_{x \rightarrow 0} 0 - 0 + 3 - \frac{2}{x}$$

$$\boxed{\frac{4\sqrt{3} + 8}{16} \div 4} \rightsquigarrow \frac{\sqrt{3} + 2}{4}$$

$$\rightsquigarrow \frac{x^2 - 3x + 3 - \frac{2}{x}}{1}$$