n. 16 p. 741

$$y = \frac{x^2+1}{x^2-9} \qquad x^2-9 \neq 0 \rightarrow x = \pm 3 \rightarrow D = \mathbb{R} - \{-3; +3\}$$

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

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

$x = -3$ punto di discontinuità di 2ª specie

$$\lim_{x \to 3^-} \frac{x^2+1}{x^2-9} = \frac{10}{0^-} = -\infty$$

$$\lim_{x \to 3^+} \frac{x^2+1}{x^2-9} = \frac{10}{0^+} = +\infty$$

$x = 3$ punto di discontinuità di 2ª specie

n. 17 p. 741

$$y = \frac{x^2-x-2}{x^2-3x+2} \qquad x^2-3x+2 \neq 0 \quad (x-2)(x-1) \neq 0 \rightarrow x \neq 1,\ x \neq 2 \rightarrow D = \mathbb{R} - \{1; 2\}$$

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

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

$x = 1$ (2ª specie)

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

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

$x = 2$ (3ª specie)

n. 18 p. 741

$$y = \frac{|x+2|}{x+2} \qquad x+2 \neq 0 \rightarrow x \neq -2 \rightarrow D = \mathbb{R} - \{-2\}$$

$$\lim_{x \to -2^-} \frac{|x+2|}{x+2} = \lim_{x \to -2^-} \frac{-\cancel{(x+2)}}{\cancel{x+2}} = -1$$

$$\lim_{x \to -2^+} \frac{|x+2|}{x+2} = \lim_{x \to -2^+} \frac{\cancel{x+2}}{\cancel{x+2}} = 1$$

$x = -2$ (1ª specie)

$$y = 2 + \sin\frac{\pi}{x} \qquad x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$$

$$\lim_{x \to 0^-} \left(2 + \sin\frac{\pi}{x}\right) \quad \nexists$$

$$\lim_{x \to 0^+} \left(2 + \sin\frac{\pi}{x}\right) \quad \nexists$$

$x = 0$ (2ª specie)

n. 19 p. 741

$y = \frac{x}{x^4-1}$ $\quad x^4-1 \neq 0 \rightarrow (x^2+1)(x+1)(x-1) \neq 0 \rightarrow x \neq -1,\ x \neq 1 \rightarrow D = \mathbb{R} - \{-1; 1\}$

$\lim_{x \to -1^-} \frac{x}{x^4-1} = \frac{-1}{0^+} = -\infty$

$\lim_{x \to -1^+} \frac{x}{x^4-1} = \frac{-1}{0^-} = +\infty$ $\quad x = -1 \quad (2^a \text{ specie})$

$\lim_{x \to 1^-} \frac{x}{x^4-1} = \frac{1}{0^-} = -\infty$

$\lim_{x \to 1^+} \frac{x}{x^4-1} = \frac{1}{0^+} = +\infty$ $\quad x = 1 \quad (2^a \text{ specie})$

$y = \frac{\sin x}{x}$ $\quad x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

$\lim_{x \to 0^-} \frac{\sin x}{x} = \lim_{x \to 0^+} \frac{\sin x}{x} = 1$ $\quad x = 0 \quad (3^a \text{ specie})$

n. 20 p. 741

$y = \frac{x}{e^x-1}$ $\quad e^x-1 \neq 0 \rightarrow x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

$\lim_{x \to 0^-} \frac{x}{e^x-1} = \lim_{x \to 0^+} \frac{x}{e^x-1} = 1$ $\quad x = 0 \quad (3^a \text{ specie})$

$y = x + \frac{|x|}{x}$ $\quad x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

$\lim_{x \to 0^-} \left(x + \frac{|x|}{x}\right) = \lim_{x \to 0^-} \left(x - \frac{x}{x}\right) = \lim_{x \to 0^-} (x-1) = -1$

$\lim_{x \to 0^+} \left(x + \frac{|x|}{x}\right) = \lim_{x \to 0^+} \left(x + \frac{x}{x}\right) = \lim_{x \to 0^+} (x+1) = +1$ $\quad x = 0 \quad (1^a \text{ specie})$

n. 21 p. 741

$y = \frac{\sqrt{x}-1}{x-1}$ $\quad x \geq 0 \wedge x-1 \neq 0 \rightarrow x \neq +1 \wedge x \geq 0 \rightarrow D = [0; 1) \cup (1; +\infty)$

$\lim_{x \to 1^-} \frac{\sqrt{x}-1}{x-1} = \lim_{x \to 1^-} \frac{\cancel{\sqrt{x}-1}}{(\sqrt{x}+1)\cancel{(\sqrt{x}-1)}} = \frac{1}{2}$

$\lim_{x \to 1^+} \frac{\sqrt{x}-1}{x-1} = \lim_{x \to 1^+} \frac{\cancel{\sqrt{x}-1}}{(\sqrt{x}+1)\cancel{(\sqrt{x}-1)}} = \frac{1}{2}$ $\quad x = 1 \quad (3^a \text{ specie})$

$y = e^{\frac{x+1}{x-3}}$ $\quad x-3 \neq 0 \rightarrow x \neq 3 \rightarrow D = \mathbb{R} - \{3\}$

$\lim_{x \to 3^-} e^{\frac{x+1}{x-3}} = e^{\frac{4}{0^-}} = e^{-\infty} = 0$

$\lim_{x \to 3^+} e^{\frac{x+1}{x-3}} = e^{\frac{4}{0^+}} = e^{+\infty} = +\infty$ $\quad x = 3 \quad (2^a \text{ specie})$

n. 22 p. 742

$y = \frac{2x^2+5x-7}{|x-1|}$ $|x-1| \neq 0 \rightarrow x \neq 1 \rightarrow D = \mathbb{R} - \{1\}$

$\lim_{x \to 1^-} \frac{2x^2+5x-7}{|x-1|} = \lim_{x \to 1^-} \frac{\cancel{(x-1)}(2x+7)}{-\cancel{(x-1)}} = -9$

$\lim_{x \to 1^+} \frac{2x^2+5x-7}{|x-1|} = \lim_{x \to 1^+} \frac{\cancel{(x-1)}(2x+7)}{\cancel{(x-1)}} = 9$

$x = 1$ (1ª specie)

$y = 3x^2 + \frac{5x}{|x|}$ $|x| \neq 0 \rightarrow x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

$\lim_{x \to 0^-} \left(3x^2 + \frac{5x}{|x|}\right) = \lim_{x \to 0^-} \left(3x^2 + \frac{5x}{-x}\right) = \lim_{x \to 0^-} (3x^2 - 5) = -5$

$\lim_{x \to 0^+} \left(3x^2 + \frac{5x}{|x|}\right) = \lim_{x \to 0^+} \left(3x^2 + \frac{5x}{x}\right) = \lim_{x \to 0^+} (3x^2 + 5) = 5$

$x = 0$ (1ª specie)

n. 23 p. 742

$y = e^{\frac{x}{x^2-1}}$ $x^2 - 1 \neq 0 \rightarrow x \neq -1, x \neq 1 \rightarrow D = \mathbb{R} - \{-1; 1\}$

$\lim_{x \to -1^-} e^{\frac{x}{x^2-1}} = e^{\frac{-1}{0^+}} = e^{-\infty} = 0$

$\lim_{x \to -1^+} e^{\frac{x}{x^2-1}} = e^{\frac{-1}{0^-}} = e^{+\infty} = +\infty$

$x = -1$ (2ª specie)

$\lim_{x \to 1^-} e^{\frac{x}{x^2-1}} = e^{\frac{1}{0^-}} = e^{-\infty} = 0$

$\lim_{x \to 1^+} e^{\frac{x}{x^2-1}} = e^{\frac{1}{0^+}} = e^{+\infty} = +\infty$

$x = 1$ (2ª specie)

$y = 3^{\frac{2}{x-3}}$ $x - 3 \neq 0 \rightarrow x \neq 3 \rightarrow D = \mathbb{R} - \{3\}$

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

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

$x = 3$ (2ª specie)

n. 24 p. 742

$y = \frac{\log(1+x)}{x}$ $\begin{cases} 1+x > 0 \\ x \neq 0 \end{cases} \rightarrow \begin{cases} x > -1 \\ x \neq 0 \end{cases} \rightarrow D = (-1; 0) \cup (0; +\infty)$

$\lim_{x \to 0^-} \frac{\log(1+x)}{x} = \lim_{x \to 0^+} \frac{\log(1+x)}{x} = 1$ $x = 0$ (3ª specie)

$\lim_{x \to -1^+} \frac{\log(1+x)}{x} = +\infty$ $x = -1$ (2ª specie)

n. 25 p. 742

$$y = \frac{x}{\log(1+x)} \qquad \begin{cases} 1+x>0 \\ \log(1+x) \neq 0 \end{cases} \rightarrow \begin{cases} x>-1 \\ x \neq 0 \end{cases} \rightarrow D = (-1;0) \cup (0;+\infty)$$

$$\lim_{x\to 0^-} \frac{x}{\log(1+x)} = \lim_{x\to 0^+} \frac{x}{\log(1+x)} = 1 \qquad x=0 \quad (3^a \text{ specie})$$

$$\lim_{x\to -1^+} \frac{x}{\log(1+x)} = 0$$

n. 26 p. 742

$$y = \frac{|x+1|}{x+1} e^{\frac{1}{x-2}} \qquad x \neq -1,\ x \neq 2 \rightarrow D = \mathbb{R} - \{-1;2\}$$

$$\lim_{x\to -1^-} \frac{|x+1|}{x+1} e^{\frac{1}{x-2}} = \lim_{x\to -1^-} \frac{-\cancel{(x+1)}}{\cancel{x+1}} e^{\frac{1}{x-2}} = -e^{-\frac{1}{3}}$$

$$\lim_{x\to -1^+} \frac{|x+1|}{x+1} e^{\frac{1}{x-2}} = \lim_{x\to -1^+} \frac{\cancel{x+1}}{\cancel{x+1}} e^{\frac{1}{x-2}} = e^{-\frac{1}{3}} \qquad x=-1 \quad (1^a \text{ specie})$$

$$\lim_{x\to 2^-} \frac{|x+1|}{x+1} e^{\frac{1}{x-2}} = \lim_{x\to 2^-} \frac{\cancel{x+1}}{\cancel{x+1}} e^{\frac{1}{x-2}} = e^{\frac{1}{0^-}} = e^{-\infty} = 0$$

$$\lim_{x\to 2^+} \frac{|x+1|}{x+1} e^{\frac{1}{x-2}} = \lim_{x\to 2^+} \frac{\cancel{x+1}}{\cancel{x+1}} e^{\frac{1}{x-2}} = e^{\frac{1}{0^+}} = e^{+\infty} = +\infty \qquad x=2 \quad (2^a \text{ specie})$$

n. 27 p. 742

$$y = \frac{x-2}{|x-2|} e^{\frac{1}{x}} \qquad x \neq 2,\ x \neq 0 \rightarrow D = \mathbb{R} - \{0;2\}$$

$$\lim_{x\to 2^-} \frac{x-2}{|x-2|} e^{\frac{1}{x}} = \lim_{x\to 2^-} \frac{\cancel{x-2}}{-\cancel{(x-2)}} e^{\frac{1}{x}} = -e^{\frac{1}{2}}$$

$$\lim_{x\to 2^+} \frac{x-2}{|x-2|} e^{\frac{1}{x}} = \lim_{x\to 2^+} \frac{\cancel{x-2}}{\cancel{x-2}} e^{\frac{1}{x}} = e^{\frac{1}{2}} \qquad x=2 \quad (1^a \text{ specie})$$

$$\lim_{x\to 0^-} \frac{x-2}{|x-2|} e^{\frac{1}{x}} = \lim_{x\to 0^-} \frac{\cancel{x-2}}{-\cancel{(x-2)}} e^{\frac{1}{x}} = -e^{\frac{1}{0^-}} = -e^{-\infty} = 0$$

$$\lim_{x\to 0^+} \frac{x-2}{|x-2|} e^{\frac{1}{x}} = \lim_{x\to 0^+} \frac{x-2}{-(x-2)} e^{\frac{1}{x}} = -e^{\frac{1}{0^+}} = -e^{+\infty} = -\infty \qquad x=0 \quad (2^a \text{ specie})$$

n. 28 p. 742

$$y=\frac{|x-1|}{x^3-2x^2-5x+6}$$

$$x^3-2x^2-5x+6\neq 0$$
$$(x-1)(x^2-x-6)\neq 0$$
$$(x-1)(x-3)(x+2)\neq 0$$
$$x\neq -2,\quad x\neq 1,\quad x\neq 3$$

$$\begin{array}{c|ccc|c} & 1 & -2 & -5 & 6 \\ 1 & & 1 & -1 & -6 \\ \hline & 1 & -1 & -6 & 0 \end{array}$$

$$D=\mathbb{R}-\{-2;1;3\}$$

$$\lim_{x\to -2^-}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to -2^-}\frac{-\cancel{(x-1)}}{\cancel{(x-1)}(x-3)(x+2)}=-\infty$$

$$\lim_{x\to -2^+}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to -2^+}\frac{-1}{(x-3)(x+2)}=+\infty$$

$x=-2$ $(2^a$ specie$)$

$$\lim_{x\to 1^-}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to 1^-}\frac{-\cancel{(x-1)}}{\cancel{(x-1)}(x-3)(x+2)}=\frac{1}{6}$$

$$\lim_{x\to 1^+}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to 1^+}\frac{\cancel{x-1}}{\cancel{(x-1)}(x-3)(x+2)}=-\frac{1}{6}$$

$x=1$ $(1^a$ specie$)$

$$\lim_{x\to 3^-}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to 3^-}\frac{\cancel{x-1}}{\cancel{(x-1)}(x-3)(x+2)}=-\infty$$

$$\lim_{x\to 3^+}\frac{|x-1|}{x^3-2x^2-5x+6}=\lim_{x\to 3^+}\frac{\cancel{x-1}}{\cancel{(x-1)}(x-3)(x+2)}=+\infty$$

$x=3$ $(2^a$ specie$)$

n. 29 p. 742

$$y=\frac{1}{1-2^{\frac{1}{x}}}\qquad x\neq 0\ \to\ D=\mathbb{R}-\{0\}$$

$$\lim_{x\to 0^-}\frac{1}{1-2^{\frac{1}{x}}}=\frac{1}{1-2^{-\infty}}=1$$

$$\lim_{x\to 0^+}\frac{1}{1-2^{\frac{1}{x}}}=\frac{1}{1-2^{+\infty}}=0$$

$x=0$ $(1^a$ specie$)$

$$y=\sin\frac{1}{x^3-1}\qquad x^3-1\neq 0\ \to\ x\neq 1\ \to\ D=\mathbb{R}-\{1\}$$

$$\lim_{x\to 1^-}\sin\frac{1}{x^3-1}\quad\nexists$$

$$\lim_{x\to 1^+}\sin\frac{1}{x^3-1}\quad\nexists$$

$x=1$ $(2^a$ specie$)$

n. 30 p. 742

$$y = 2x^2 + \frac{x}{|x|} + \frac{1}{x+5} \qquad D = \mathbb{R} - \{-5; 0\}$$

$$\lim_{x \to 0^-} \left(2x^2 + \frac{x}{|x|} + \frac{1}{x+5}\right) = \lim_{x \to 0^-} \left(2x^2 - 1 + \frac{1}{x+5}\right) = -\frac{4}{5}$$

$$\lim_{x \to 0^+} \left(2x^2 + \frac{x}{|x|} + \frac{1}{x+5}\right) = \lim_{x \to 0^+} \left(2x^2 + 1 + \frac{1}{x+5}\right) = \frac{6}{5}$$

$x = 0$ (1^a specie)

$$\lim_{x \to -5^-} \left(2x^2 + \frac{x}{|x|} + \frac{1}{x+5}\right) = \lim_{x \to -5^-} \left(2x^2 - 1 + \frac{1}{x+5}\right) = -\infty$$

$$\lim_{x \to -5^+} \left(2x^2 + \frac{x}{|x|} + \frac{1}{x+5}\right) = \lim_{x \to -5^+} \left(2x^2 - 1 + \frac{1}{x+5}\right) = +\infty$$

$x = -5$ (2^a specie)

n. 31 p. 742

$$y = x \sin\frac{1}{x} \qquad x \neq 0 \to D = \mathbb{R} - \{0\}$$

$$\lim_{x \to 0^-} x \sin\frac{1}{x} = \lim_{t \to -\infty} \frac{\sin t}{t} = 0$$

$$t = \frac{1}{x}$$

$$\lim_{x \to 0^+} x \sin\frac{1}{x} = \lim_{t \to +\infty} \frac{\sin t}{t} = 0$$

$x = 0$ (3^a specie)

$$y = \operatorname{arctg}\frac{1}{x} \qquad D = \mathbb{R} - \{0\}$$

$$\lim_{x \to 0^-} \operatorname{arctg}\frac{1}{x} = -\frac{\pi}{2}$$

$$\lim_{x \to 0^+} \operatorname{arctg}\frac{1}{x} = +\frac{\pi}{2}$$

$x = 0$ (1^a specie)

n. 32 p. 742

$$y = \begin{cases} x+2 & \text{per } x > 0 \\ 3 & \text{per } x = 0 \\ \dfrac{\sin x}{x} & \text{per } x < 0 \end{cases}$$

$$\lim_{x \to 0^-} f(x) = \lim_{x \to 0^-} \frac{\sin x}{x} = 1$$

$$\lim_{x \to 0^+} f(x) = \lim_{x \to 0^+} (x+2) = 2$$

$x = 0$ (1^a specie)

n. 33 p. 742

$$y = \begin{cases} \frac{e^x - 1}{x} & \text{per } x<0 \\ 1+x & \text{per } x>0 \end{cases} \qquad f(0) \nexists$$

$$\lim_{x\to 0^-} f(x) = \lim_{x\to 0^-} \frac{e^x-1}{x} = 1$$

$$\lim_{x\to 0^+} f(x) = \lim_{x\to 0^+} (1+x) = 1$$

$x=0$ (3^a specie)

n. 34 p. 742

$$y = \begin{cases} 1+x^2 & \text{per } x>3 \\ 1 & \text{per } x=3 \\ 7+x & \text{per } x<3 \end{cases} \qquad f(3)=1$$

$$\lim_{x\to 3^-} f(x) = \lim_{x\to 3^-} (7+x) = 10$$

$$\lim_{x\to 3^+} f(x) = \lim_{x\to 3^+} (1+x^2) = 10$$

$x=3$ (3^a specie)

n. 35 p. 742

$$y = \frac{1-\cos x}{\cos x - \cos 2x}$$

$$\cos x - \cos 2x \neq 0$$
$$\cos x - 2\cos^2 x + 1 \neq 0$$
$$2\cos^2 x - \cos x - 1 \neq 0$$
$$(\cos x - 1)(2\cos x + 1) \neq 0$$
$$\cos x \neq 1 \rightarrow x \neq 2K\pi$$
$$\cos x \neq -\frac{1}{2} \rightarrow x \neq \pm\frac{2}{3}\pi + 2K\pi$$

$$\lim_{x\to 0} \frac{1-\cos x}{\cos x - \cos 2x} = \lim_{x\to 0} \frac{\cancel{1-\cos x}}{-\cancel{(1-\cos x)}(2\cos x+1)} = -\frac{1}{3}$$

$x = 2K\pi$ (3^a specie)

$$\lim_{x\to \frac{2}{3}\pi^-} \frac{1-\cos x}{\cos x - \cos 2x} = \lim_{x\to \frac{2}{3}\pi^-} \frac{-1}{2\cos x + 1} = \frac{-1}{0^+} = -\infty$$

$$\lim_{x\to \frac{2}{3}\pi^+} \frac{1-\cos x}{\cos x - \cos 2x} = \lim_{x\to \frac{2}{3}\pi^+} \frac{-1}{2\cos x + 1} = \frac{-1}{0^-} = +\infty$$

$x = \pm\frac{2}{3}\pi + 2K\pi$ (2^a specie)

n. 36 p. 742

$$y = \frac{2x}{\sin 3x} \qquad \sin 3x \neq 0 \to 3x \neq K\pi \to x \neq K\frac{\pi}{3}$$

$$\lim_{x\to 0} \frac{2x}{\sin 3x} = \frac{2}{3} \qquad x = 0 \quad (3^a \text{ specie})$$

$$\lim_{x\to \frac{\pi}{3}^-} \frac{2x}{\sin 3x} = \frac{\frac{2\pi}{3}}{0^+} = +\infty$$

$$x = K\frac{\pi}{3},\ K \neq 0 \quad (2^a \text{ specie})$$

$$\lim_{x\to \frac{\pi}{3}^+} \frac{2x}{\sin 3x} = \frac{\frac{2\pi}{3}}{0^-} = -\infty$$

n. 37 p. 742

$$y = \frac{x^2}{1-\cos x} \qquad 1-\cos x \neq 0 \to \cos x \neq 1 \to x = 2K\pi$$

$$\lim_{x\to 0} \frac{x^2}{1-\cos x} = 2 \qquad x = 0 \quad (3^a \text{ specie})$$

$$\lim_{x\to 2\pi^-} \frac{x^2}{1-\cos x} = \frac{4\pi^2}{0^+} = +\infty$$

$$x = 2K\pi,\ K \neq 0 \quad (2^a \text{ specie})$$

$$\lim_{x\to 2\pi^+} \frac{x^2}{1-\cos x} = \frac{4\pi^2}{0^+} = +\infty$$

n. 38 p. 743

$$f(x) = \begin{cases} 0 & \forall x \in \mathbb{R},\ \text{razionale} \\ 1 & \forall x \in \mathbb{R},\ \text{irrazionale} \end{cases}$$

$$c \in \mathbb{R}$$

$$\lim_{x\to c^-} f(x) \quad \nexists$$

ogni $x \in \mathbb{R}$ $(2^a$ specie$)$

$$\lim_{x\to c^+} f(x) \quad \nexists$$

n. 39 p. 743

$$f(x) = \begin{cases} \dfrac{x}{\sin x} & \text{per } x > 0 \\ 1+x & \text{per } x < 0 \end{cases} \qquad \sin x \neq 0 \quad x \neq K\pi \quad K \in \mathbb{Z},\ K > 0$$

$$\lim_{x\to 0^-} f(x) = \lim_{x\to 0^-} (1+x) = 1$$

$$x = 0 \quad (3^a \text{ specie})$$

$$\lim_{x\to 0^+} f(x) = \lim_{x\to 0^+} \frac{x}{\sin x} = 1$$

$$\lim_{x\to \pi^-} f(x) = \lim_{x\to \pi^-} \frac{x}{\sin x} = \frac{\pi}{0^+} = +\infty \qquad x = K\pi,\ K \in \mathbb{Z},\ K > 0 \quad (2^a \text{ specie})$$

n. 40 p. 743

$$f(x) = \frac{e^{2x}-1}{x} \qquad D = \mathbb{R} - \{0\}$$

$$\lim_{x\to 0} f(x) = \lim_{x\to 0}\left(2\cdot\frac{e^{2x}-1}{2x}\right) = 2 \qquad x=0 \qquad (3^a \text{ specie})$$

$g(x) = f(x) \quad \forall x \neq 0$ se $g(0) = 2$ allora g è continua $\forall x \in \mathbb{R}$

n. 41 p. 743

$$f(x) = \begin{cases} ax+4 & \text{per } x>2 \\ 4+x & \text{per } x<2 \end{cases}$$

$$\lim_{x\to 2^-} f(x) = \lim_{x\to 2^-}(4+x) = 6$$

$$\lim_{x\to 2^+} f(x) = \lim_{x\to 2^+}(ax+4) = 2a+4$$

Si ha una discontinuità eliminabile se

$$\lim_{x\to 2^-} f(x) = \lim_{x\to 2^+} f(x)$$

$$6 = 2a+4$$

$$-2a = -2 \quad \rightarrow \quad a = 1$$

n. 42 p. 743

$$f(x) = \begin{cases} ax+4 & \text{per } x\geq 1 \\ x^2+1 & \text{per } x<1 \end{cases}$$

$$\lim_{x\to 1^-} f(x) = \lim_{x\to 1^-}(x^2+1) = 2$$

$$\lim_{x\to 1^+} f(x) = \lim_{x\to 1^+}(ax+4) = a+4$$

salto $= 2$

$$\left|\lim_{x\to 1^+} f(x) - \lim_{x\to 1^-} f(x)\right| = 2$$

$$|a+4-2| = 2$$

$$|a+2| = 2$$

$$a+2 = -2 \quad \vee \quad a+2 = 2$$

$$a = -4 \quad \vee \quad a = 0$$