Punti di discontinuità

PASSED

individuare e classificare gli eventuali punti di discontinuità delle seguenti funzioni

1	$y=\begin{cases}1 & per\ x\neq 3\\ 2 & per\ x=3\end{cases}$	$x=3$ *III specie*
2	$y=\dfrac{3x-1}{2x+5}$	$x=-\dfrac{5}{2}$ *II specie*
3	$y=\dfrac{x-2}{x-\sqrt{2}}$	$x=\sqrt{2}$ *II specie*
4	$y=\dfrac{x^3-2x^2}{x^2-4}$	$x=-2$ *II specie*
5	$y=\dfrac{x-1}{x^2-4}$	$x=\pm 2$ *II specie*
6	$y=\begin{cases}\dfrac{1}{x} & 0<x<1\\ 0 & x=1\\ \dfrac{2}{x+1} & x>1\end{cases}$	$x=1$ *III specie*
7	$y=\begin{cases}x^2+1 & x\leq 2\\ 3x+2 & x>2\end{cases}$	$x=2$ *I specie*
8	$y=\begin{cases}x+3 & x\leq 3\\ 3-x^3 & x>3\end{cases}$	$x=3$ *I specie*
9	$y=\dfrac{x}{x^3-1}$	$x=1$ *II specie*
10	$y=\begin{cases}x^3+2 & x>2\\ 1 & x=2\\ x+8 & x<2\end{cases}$	$x=2$ *III specie*
11	$y=\dfrac{x^2+2x+1}{x^2-x-2}$	$x=2$ *II specie* $x=-1$ *III specie*

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12	$y = 5^{\frac{x}{2x-1}}$	$x = \frac{1}{2}$ *II specie*
13	$y = xe^{-\frac{1}{x^2}}$	$x = 0$ *III specie*
14	$y = e^{\frac{x+1}{3x-5}}$	$x = \frac{5}{3}$ *II specie*
15	$y = \frac{2x}{e^x - 1}$	$x = 0$ *III specie*
16	$y = \frac{3}{3 - 3^{\frac{1}{x}}}$	$x = 0$ *I specie* $x = 1$ *II specie*
17	$y = e^{\frac{x}{x^2-2}}$	$x = \pm\sqrt{2}$ *II specie*
18	$y = 2^{-\frac{1}{x}} - 2^{\frac{1}{x}}$	$x = 0$ *II specie*
19	$y = \frac{2x}{(e^{2x} - 1)(e^{2x} - e)}$	$x = 0$ *III specie* $x = \frac{1}{2}$ *II specie*

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20	$y=\begin{cases}\dfrac{1}{x-3} & x>3\\ e^{\frac{1}{x-3}} & x<3\end{cases}$	$x=3$ *II specie*
21	$y=\begin{cases}e^{x} & x>0\\ e^{-x} & x<0\end{cases}$	$x=0$ *III specie*
22	$y=\dfrac{1}{2^{3^{x}}-2}$	$x=0$ *II specie*
23	$y=\begin{cases}\dfrac{e^{-3x}-1}{2x} & x\neq 0\\ -\dfrac{3}{2} & x=0\end{cases}$	*funzione continua*
24	$y=\dfrac{sin\,2x}{x-\pi}$	$x=\pi$ *III specie*
25	$y=x\,sin\dfrac{1}{x}$	$x=0$ *III specie*
26	$y=\begin{cases}\dfrac{sin\,x}{x} & x<0\\ 1-x^{2} & x>0\end{cases}$	$x=0$ *III specie*
27	$y=\dfrac{x}{sin\,2x}$	$x=0$ *III specie* $x=\dfrac{k\pi}{2}, k\in Z-\{0\}$ *II specie*

28	$y = \dfrac{1}{arctan\,\dfrac{1}{x}}$	$x = 0$ *I specie*
29	$y = cos\left(\frac{1}{sin\,x}\right)$	$x = k\pi$ *II specie*
30	$y = \dfrac{e^{sin^2 x} - 1}{cos^2 x - 1}$	$x = k\pi$ *III specie*
31	$y = \begin{cases} sin\,x & x < \dfrac{\pi}{4} \\ \sqrt{2} & x = \dfrac{\pi}{4} \\ cos\,x & x > \dfrac{\pi}{4} \end{cases}$	$x = \dfrac{\pi}{4}$ *III specie*
32	$y = \dfrac{tan\left(\frac{x}{2}\right)}{x^2 + 2x + 2}$	$x = (2k+1)\pi$ *II specie*
33	$y = arctan\dfrac{1}{x}$	$x = 0$ *I specie*
34	$y = \dfrac{\sqrt{\pi x - x^2}}{sin\,x}$	$x = 0$ *II specie* $x = \pi$ *II specie*
35	$y = \begin{cases} x^2 - 2x + 2 & x < 1 \\ \dfrac{sin\,x}{x} & x \geq 1 \end{cases}$	*funzione continua*

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36	$y=\begin{cases}5x & x>0\\ 3e^{\frac{1}{x}}sin\frac{1}{x} & x<0\end{cases}$	*funzione continua*
37	$y=\frac{\lvert x\rvert}{x}$	$x=0$ *I specie*
38	$y=\frac{\lvert 9-x^2\rvert}{x+3}$	$x=-3$ *I specie*
39	$y=\frac{x-3}{x}ln\left\lvert\frac{x}{x-3}\right\rvert$	$x=0$ *II specie* $x=3$ *III specie*
40	$y=ln\ \lvert sinx\rvert$	$x=k\pi$ *II specie*
41	$y=\frac{x^2-4x+3}{\lvert x-1\rvert}$	$x=1$ *I specie*
42	$y=\frac{sin\,x}{\lvert x\rvert}$	$x=0$ *I specie*
43	$y=x+\frac{x}{\lvert x\rvert}+\frac{1}{x+3}$	$x=0$ *I specie* $x=-3$ *II specie*
44	$y=\frac{e^x}{\lvert x+2\rvert}$	$x=-2$ *II specie*
45	$y=sin\lvert x\rvert-x$	*funzione continua*
46	$y=\lvert x-1\rvert\,cos\,x$	$x=1$ *I specie*

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47	$y = \lvert sin\ x\rvert\ sin\left(\frac{x}{2}\right)$	$x = (2k+1)\pi$ *I specie*
48	$y = log_2(1 + \lvert sin\ x\rvert)$	*funzione continua*
49	$y = ln\lvert x - \lvert x\rvert\rvert$	$x = 0$ *II specie*
50	$y = \frac{4}{(x+2)(\lvert x\rvert + 1)}$	$x = -2$ *II specie*
51	$y = \frac{ln(x+2)}{\lvert x+1\rvert}$	$x = -1$ *I specie* $x = -2$ *II specie*
52	$y = \frac{x\lvert x\rvert}{1 - cos\ x}$	$x = 0$ *I specie* $x = 2k\pi, k \in -\{0\}$ *II specie*
53	$y = \frac{cos\ \pi x}{\lvert 2x-1\rvert}$	$x = \frac{1}{2}$ *I specie*
54	$y = \frac{x^3 - x}{x^2 - \lvert x\rvert}$	$x = 0$ *I specie* $x = \pm 1$ *III specie*
55	$y = \frac{(1+ln\lvert x\rvert)^k - 1}{\lvert ln\ x\rvert},\ k > 1$	$x = 0$ *II specie* $x = 1$ *I specie*
56	$y = (1 + ln\lvert x\rvert)^{\frac{1}{x-1}} - 1$	$x = \pm\frac{1}{e}$ *II specie* $x = 1$ *III specie*

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57	$y=\begin{cases}4x^3+ln\lvert x-1\rvert & x<0\\ sin\left(\frac{1}{x}\right) & x=0\\ e^{3x}-1 & x>0\end{cases}$	$x=0$ *III specie* $x=1$ *II specie*
58	$y=ln\lvert x\rvert-ln\lvert x^3\rvert$	$x=0$ *II specie*
59	Stabilire per quali valori del parametro "a", la seguente funzione presenta una discontinuità di *I spicie* con salto uguale a $\frac{5}{2}$: $y=\begin{cases}ax-3 & x>\frac{1}{2}\\ 5+x & x<\frac{1}{2}\end{cases}$	$a=12$ $a=22$
60	Stabilire per quali valori del parametro "a", la seguente funzione presenta una discontinuità di *III specie*: $y=\begin{cases}x^2-3ax+5 & x>2\\ 4x^3+10ax^2 & x<2\end{cases}$	$a=-\frac{1}{2}$
61	Stabilire per quali valori del parametro "a", la seguente funzione presenta una discontinuità di *II specie*, nel punto $x=\sqrt[3]{4}$ $y=\frac{x^3+1}{x^6-a}$	$a=16$

determinare il valore del parametro a per il quale le seguenti funzioni risultino continue

62	$y=\begin{cases}2x-3a & x\geq 1\\ \frac{a}{2}-x^2 & x<1\end{cases}$	$a=\frac{6}{7}$

63	$y=\begin{cases}2ax^2+3x+5a & x\geq 2\\ x^3+ax^2+7 & x<2\end{cases}$	$a=1$
64	$y=\begin{cases}\dfrac{6}{x+2} & x\geq 0\\ 2x^2-2x+a & x<0\end{cases}$	$a=3$
65	$y=\begin{cases}4-3\sqrt{x} & x\geq 0\\ 4x^2-3x+4a & x<0\end{cases}$	$a=1$
66	$y=\begin{cases}x^2-1 & x<2\\ \sqrt{4x+a} & x\geq 2\end{cases}$	$a=1$
67	$y=\begin{cases}\frac{x+a}{x-a} & x\leq -1\\ x\sqrt{a+1} & x>-1\end{cases}$ in R^-	$a=0$
68	$y=\begin{cases}x^2+ax+1 & x<7\\ x-a^2 & x\geq 7\end{cases}$	*nessun valore di a*
69	$y=\begin{cases}xe^{2x}+2a & x\geq 0\\ \dfrac{1}{2-x} & x<0\end{cases}$	$a=\frac{1}{4}$
70	$y=\begin{cases}x^3e^{1-x^{-4}} & -1\leq x<0\\ axe^{-x^3} & x<-1 \vee x\geq 0\end{cases}$	$a=\frac{1}{e}$

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71	$y=\begin{cases}\dfrac{ln(1+8x)}{2x} & x>0\\ 2x^3-x^2-2a & x\le 0\end{cases}$	$a=-2$
72	$y=\begin{cases}\dfrac{a^x-1}{x} & x<0\\ a^x-\ln a & x\ge 0\end{cases}$	$a=\sqrt{e}$
73	$y=\begin{cases}a+x^3 & x<-\dfrac{1}{2}\\ a\,3^x & x\ge -\dfrac{1}{2}\end{cases}$	$a=\dfrac{3+\sqrt{3}}{16}$
74	$y=\begin{cases}\dfrac{x-x^a}{x-1} & x\le 1\\ \dfrac{ln(ax-a+1)}{x-1} & x>1\end{cases}$	$a=\dfrac{1}{2}$
75	$y=\begin{cases}\dfrac{\sin 2x}{e^x-1} & x>0\\ a(x^2-1) & x\le 0\end{cases}$	$a=-2$
76	$y=\begin{cases}a\sin x & x\le \dfrac{\pi}{2}\\ x-a & x>\dfrac{\pi}{2}\end{cases}$	$a=\dfrac{\pi}{4}$
77	$y=\begin{cases}\sin ax & x\le \pi\\ \cos ax & x>\pi\end{cases}$	$a=k+\dfrac{1}{4}$
78	$y=\begin{cases}ax^2+\pi & x<-\dfrac{\pi}{3}\ \ o\ \ x\ge\dfrac{\pi}{3}\\ \cos x & -\dfrac{\pi}{3}\le x<\dfrac{\pi}{3}\end{cases}$	$a=\dfrac{9}{\pi}\left(\dfrac{1}{2\pi}-1\right)$

79	$y=\begin{cases}\dfrac{a(\sin x-1)}{2x-\pi} & x<\dfrac{\pi}{2}\\ e^x-a & x\geq\dfrac{\pi}{2}\end{cases}$	$a=e^{\frac{\pi}{2}}$

determinare i valori dei parametri a e b per i quali le seguenti funzioni risultino continue

80	$y=\begin{cases}x^3-\dfrac{b}{x} & x<-1\\ x^2+a & -1\leq x\leq 1\\ a+xb & x>1\end{cases}$	$a=-1$ $b=1$
81	$y=\begin{cases}x^2-2x+a & x<\dfrac{1}{2}\\ 1+bx & \dfrac{1}{2}\leq x\leq 1\\ \dfrac{a}{bx} & x>1\end{cases}$	$a=\dfrac{13\pm\sqrt{29}}{8}$ $b=-\dfrac{1\pm\sqrt{29}}{4}$
82	$y=\begin{cases}ax^2+3x+b & x\geq 1\\ a(x-1)+3 & -2\leq x<1\\ (x+2)a+bx+1 & x<-2\end{cases}$	$a=\dfrac{2}{5}\ ;\ b=-\dfrac{2}{5}$
83	$y=\begin{cases}-(x+a) & x\leq -1\\ x^2-a+(b-1)^2 & -1<x<2\\ b+x+2 & x\geq 2\end{cases}$	$a=-1$ $b=1$
84	$y=\begin{cases}\sqrt{a-x^2} & x<1\\ \sqrt{1-(x-b)^2} & 1\leq x\leq 3\\ a+b-x & x>3\end{cases}$	$a=1$ $b=2$

85	$y=\begin{cases} ax^2+bx & x<1 \\ e^x & 1\le x\le \ln a \\ \dfrac{x-\ln a}{4}+b & x>\ln a \end{cases}$	$a=b=\dfrac{e}{2}$
86	$y=\begin{cases} \dfrac{e^x-e^{-x}}{a} & x\ge 0 \\ b(e^x+e^{-x}) & 0<x<\ln 3 \\ ab\,3^x & x\ge \ln 3 \end{cases}$	$a\neq 0$ $b=0$
87	$y=\begin{cases} a+\ln x & x\le 1 \\ \ln(bx) & 1<x<2 \\ \ln(ab)^x & x\ge 2 \end{cases}$	$a\approx 0.9012$ $b\approx 2.4626$
88	$y=\begin{cases} e^x+a & x<0 \\ 2^x+b & 0\le x<1 \\ 3^x+a-b & x\ge 1 \end{cases}$	$a=1$ $b=1$
89	$y=\begin{cases} \ln(x^3+3x-ax^2-1) & x\le 2 \\ \ln(x+b-3) & 2<x<3 \\ \ln(ab)+3-x & x\ge 3 \end{cases}$	$a=1$ $b=10$

90	$y=\begin{cases} a+\cos x & x\le\frac{\pi}{3} \\ b\sin x & \frac{\pi}{3}<x\le\pi \\ a+bx & x>\pi \end{cases}$	$a=-\frac{\pi}{2\pi+\sqrt{3}}$ $b=\frac{1}{2\pi+\sqrt{3}}$
91	$y=\begin{cases} 2\cos x-a & x\le\frac{\pi}{4} \\ \frac{a}{x} & \frac{\pi}{4}<x<1 \\ \pi\,\frac{x^2}{b} & x\ge 1 \end{cases}$ in R^+	$a=\frac{\sqrt{2}\,\pi}{\pi+4}$ $b=\frac{\pi+4}{\sqrt{2}}$
92	$y=\begin{cases} -\frac{a}{3}\cos x & x>-\frac{\pi}{3} \\ b\sin^2 2x-a & -\frac{\pi}{2}<x\le-\frac{\pi}{3} \\ \frac{\sin x}{2b} & x\le-\frac{\pi}{2} \end{cases}$	$a=\pm\frac{3}{2\sqrt{5}}$ $b=\pm\frac{\sqrt{5}}{3}$
93	$y=\begin{cases} 3cosx-1 & x\ge\frac{\pi}{2} \\ asinx+2b & -\frac{\pi}{2}<x<\frac{\pi}{2} \\ 3sinx+5 & x\le-\frac{\pi}{2} \end{cases}$	$a=-\frac{3}{2}\ ;\ b=\frac{1}{4}$
94	$y=\begin{cases} \frac{1}{2}x-\frac{\pi}{2} & x\ge\frac{\pi}{2} \\ 2asinx-3bcosx & 0<x<\frac{\pi}{2} \\ ln(x+e) & -e<x\le 0 \end{cases}$	$a=-\frac{\pi}{8}\ ;\ b=-\frac{1}{3}$

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95	$y=\begin{cases} a\sin x+b\cos x & x\le\frac{\pi}{3} \\ b\sin x-(a+1)\cos x & \frac{\pi}{3}<x\le 3\pi \\ \frac{a+b}{\pi}x & x>3\pi \end{cases}$	$a=\frac{\sqrt{3}-4}{1+5\sqrt{3}}$ $b=\frac{\sqrt{3}+3}{1+5\sqrt{3}}$
96	$y=\begin{cases} b\cos 3\pi x & x<\frac{1}{3} \\ bx^3-a+1 & \frac{1}{3}\le x\le 2 \\ a+\sin\frac{x\pi}{2} & x>2 \end{cases}$	$a=\frac{47}{40}$ $b=\frac{27}{160}$
97	$y=\begin{cases} a\sin x\pi & x<\frac{1}{2} \\ 1-ax & x\ge\frac{1}{2} \end{cases}$	$a=\frac{2}{3}$
98	$y=\begin{cases} \cos\left(x+\frac{3\pi}{2}\right) & x\le-\pi \\ a+1-\sin x & -\pi<x<\pi \\ \sin\frac{x}{2}+b\cos x & x\ge\pi \end{cases}$	$a=-1$ $b=1$
99	$y=\begin{cases} a\lvert x\rvert & x\le-4 \\ ax+b+1 & -4<x\le 3 \\ -b\lvert x\rvert & x>3 \end{cases}$	$a=\frac{3}{35}$ $b=-\frac{11}{35}$
100	$y=\begin{cases} (x-a)^2-(x+b)^2 & x\le 0 \\ a\lvert x-3\rvert-b & 0<x<3 \\ \sin\left[\left(x-\frac{1}{2}\right)\pi\right] & x\ge 3 \end{cases}$	$a=\frac{3\pm\sqrt{17}}{2}$ $b=-1$

Punti di discontinuità

PASSED

determinare la specie della discontinuità indicata per tutti i valori del parametro $k > 0$

101	$y = \frac{x - 3k}{3x^2 - 10x + 3}$	$x = 3$	$k = 1$ *III specie* $k \neq 1$ *II specie*
102	$y = \frac{x^2 - (3 + k)x + 3k}{x^2 - k^2}$	$x = k$	$k > 0$ *III specie*
103	$y = \frac{(1 + x)^k - 1}{x^k}$	$x = 0$	$k \leq 1$ *III specie* $k > 1$ *II specie*
104	$y = \frac{ln(kx)}{kx - 1}$	$x = \frac{1}{k}$	$k > 0$ *III specie*
105	$y = \frac{e^{x^k} - 1}{x}$	$x = 0$	$k < 1$ *II specie* $k \geq 1$ *III specie*
106	$y = sin\left(x^{k^2 - 4}\right)$	$x = 0$	$k \geq 2$ *continua* $k < 2$ *II specie*
107	$y = \frac{sin^2 x\,(1 - 2cos\, x + cos^2 x)}{x^k}$	$x = 0$	$k \leq 6$ *III specie* $k > 6$ *II specie*
108	$y = \frac{x\, sin(x + k\pi)}{\lvert x \rvert}$	$x = 0$	$k \in R^+ - N$ *I specie* $k \in N$ *III specie*
109	$y = \lvert x \rvert^{x + k - 3}$	$x = 0$	$k < 3$ *II specie* $k \geq 3$ *continua*
110	$y = \frac{x^k}{\lvert x \rvert}$	$x = 0$	$k < 1$ *II specie* $k = 1$ *I specie* $k > 1$ *III specie*