Disequazioni goniometriche frazionarie

indice

Gli esercizi sono proposti in ordine di difficoltà crescente.

nota: in un file così lungo e complesso può accadere che sia presente un errore di diversa natura nonostante gli esercizi siano stati controllati più volte. Saremo grati di ricevere segnalazioni di eventuali refusi o suggerimenti di qualsiasi natura.

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con disequazioni di primo grado

1	$\frac{1-2sinx}{cosx} \leq 0$	$\frac{\pi}{6}+2k\pi \leq x < \frac{\pi}{2}+2k\pi$ $\frac{5}{6}\pi+2k\pi \leq x < \frac{3}{2}\pi+2k\pi$
2	$\frac{sinx}{sinx+1} > 1$	$\emptyset$
3	$\frac{\sin x}{2\sin\frac{\pi}{4}+\cos x} > 0$	$2k\pi < x < \pi+2k\pi$
4	$\frac{2sinx+\sqrt{3}}{cosx} < 0$	$\frac{\pi}{2}+2k\pi < x < \frac{4}{3}\pi+2k\pi$ $\frac{3}{2}\pi+2k\pi < x < \frac{5}{3}\pi+2k\pi$
5	$\frac{2sinx+\sqrt{3}}{cosx} < 0$	$\frac{\pi}{2}+2k\pi < x < \frac{4}{3}\pi+2k\pi$ $\frac{3}{2}\pi+2k\pi < x < \frac{5}{3}\pi+2k\pi$
6	$\frac{\sin x}{1+2\cos x} > 0$	$2k\pi < x < \frac{2}{3}\pi+2k\pi \ \vee$ $\pi+2k\pi < x < \frac{4}{3}\pi+2k\pi$

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7	$\frac{2\sin x+\sqrt{2}}{\cos x}<0$	$\frac{\pi}{2}+2k\pi<x<\frac{5}{4}\pi+2k\pi \vee \frac{3}{2}\pi+2k\pi<x<\frac{7}{4}\pi+2k\pi$
8	$\frac{\sin x}{1-2\sin x}>0$	$2k\pi<x<\frac{\pi}{6}+2k\pi \vee \frac{5}{6}\pi+2k\pi<x<\pi+2k\pi$
9	$\frac{2\sin x+1}{\cos x}\geq 0$	$-\frac{\pi}{6}+2k\pi\leq x<\frac{\pi}{2}+2k\pi \vee \frac{7}{6}\pi+2k\pi\leq x<\frac{3}{2}\pi+2k\pi$
10	$\frac{\sin x}{\cos x+1}\geq 0$	$2k\pi<x<\pi+2k\pi$
11	$\frac{2\sin x-\sqrt{3}}{2\cos x+1}>0$	$\frac{\pi}{3}+2k\pi\leq x\leq\frac{4}{3}\pi+2k\pi \wedge x\neq\frac{2}{3}\pi+2k\pi$
12	$\frac{2\sin x-1}{\sin x}>0$	$\frac{\pi}{6}+2k\pi<x<\frac{5}{6}\pi+2k\pi \vee \pi+2k\pi<x<2\pi+2k\pi$

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13	$\frac{2\cos x - 3}{\sin x} \geq 0$	$\pi + 2k\pi < x < 2\pi + 2k\pi$
14	$\frac{2\sin x + 1}{1 - \sin x} \geq 0$	$x \neq \frac{\pi}{2} + 2k\pi$
15	$\frac{\sin x}{1 - 2\sin x} > 0$	$2k\pi < x < \frac{\pi}{6} + 2k\pi \vee \frac{5}{6}\pi + 2k\pi < x < \pi + 2k\pi$
16	$\frac{2\sin x - \sqrt{3}}{\text{sen}\, x + 1} > 0$	$\frac{\pi}{3} + 2k\pi < x < \frac{2}{3}\pi + 2k\pi$
17	$\frac{\sqrt{2} - 2\cos x}{2\sin x - \sqrt{2}} < 0$	$\frac{3}{4}\pi + k\pi < x < \frac{7}{4}\pi + 2k\pi$
18	$\frac{2\sin x + 1}{2\cos x + \sqrt{2}} \geq 0$	$2k\pi \leq x < \frac{3}{4}\pi + 2k\pi \vee \frac{7}{6}\pi + 2k\pi < \frac{5}{4}\pi + 2k\pi \vee \frac{11}{6}\pi + 2k\pi \leq x \leq 2\pi + 2k\pi$

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19	$\frac{1+\tan x}{\cos x} \geq 0$	$2k\pi \leq x \leq \frac{3}{4}\pi + 2k\pi \wedge$ $x \neq \frac{\pi}{2} + 2k\pi \vee$ $\frac{7}{4}\pi + 2k\pi \leq x \leq 2\pi + 2k\pi$
20	$\frac{3\cot x + \sqrt{3}}{2\cos x - \sqrt{3}} > 0$	$2k\pi \leq x < \frac{\pi}{6} + 2k\pi \vee$ $\frac{2}{3}\pi + 2k\pi < x < \pi + 2k\pi \vee$ $\frac{5}{3}\pi + 2k\pi < x < \frac{11}{6}\pi + 2k\pi$
21	$\frac{3\tan x - \sqrt{3}}{2\sin x - 1} \geq 0$	$2k\pi \leq x < \frac{\pi}{2} + 2k\pi \wedge$ $x \neq \frac{\pi}{6} + 2k\pi \vee$ $\frac{5}{6}\pi + 2k\pi < x \leq \frac{7}{6}\pi + 2k\pi \vee$ $\frac{3}{2}\pi + 2k\pi < x \leq 2\pi + 2k\pi$
22	$\frac{2\cos x + \sqrt{3}}{\tan x - 1} < 0$	$2k\pi \leq x < \frac{\pi}{4} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi < x < \frac{5}{6}\pi + 2k\pi \vee$ $\frac{7}{6}\pi + 2k\pi < x < \frac{5}{4}\pi + 2k\pi$ $\frac{3}{2}\pi + 2k\pi < x \leq 2\pi + 2k\pi$
23	$\frac{\sqrt{3}\tan x - 1}{2\sin x - \sqrt{3}} < 0$	$\frac{\pi}{6} + 2k\pi < x < \frac{\pi}{3} + 2k\pi$ $\frac{\pi}{2} + 2k\pi < x < \frac{2}{3}\pi + 2k\pi$ $\frac{7}{6}\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$
24	$\frac{\tan x - 1}{\tan x} < 0$	$k\pi < x < \frac{\pi}{4} + k\pi$

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25	$\frac{\sqrt{3}-\cot x}{3\cot x-\sqrt{3}}\geq 0$	$\frac{\pi}{6}+k\pi\leq x<\frac{\pi}{3}+k\pi$
26	$\frac{2\sin x-1}{2\sin x+1}<0$	$-\frac{\pi}{6}+k\pi<x<\frac{\pi}{6}+k\pi$
27	$\frac{1-2\cos x}{\tan x}\leq 0$	$2k\pi<x\leq\frac{\pi}{3}+2k\pi \ \vee$ $\frac{\pi}{2}+2k\pi<x<\pi+2k\pi \vee$ $\frac{3}{2}\pi+2k\pi<x\leq\frac{5}{3}\pi+2k\pi$
28	$\frac{1}{1-\sin x}>2$	$\frac{\pi}{6}+2k\pi<x<\frac{5}{6}\pi+2k\pi \wedge$ $x\neq\frac{\pi}{2}+2k\pi$
29	$\frac{\sin x}{1+\sin x}>2$	$\emptyset$

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30	$\frac{\sin x+\sqrt{3}}{\sin x}\geq 3$	$2k\pi < x \leq \frac{\pi}{3}+2k\pi \ \vee$ $\frac{2}{3}\pi+2k\pi \leq x < \pi+2k\pi$
31	$\frac{2\sin x+\sqrt{2}}{\tan x-\sqrt{3}}\leq 0$	$-\frac{\pi}{4}+2k\pi \leq x < \frac{\pi}{3}+2k\pi \ \vee$ $\frac{\pi}{2}+2k\pi < x \leq \frac{5}{4}\pi+2k\pi \ \vee$ $\frac{4}{3}\pi+2k\pi < x < \frac{3}{2}\pi+2k\pi$
32	$1-\frac{1}{\tan x}>0$	$\frac{\pi}{4}+k\pi < x < \frac{\pi}{2}+k\pi \ \vee$ $\frac{\pi}{2}+k\pi < x < \pi+k\pi$
33	$\frac{\sin x}{\sin x+1}>1$	*impossibile*
34	$\frac{\tan x-\tan\frac{\pi}{3}}{1-2\cos x}>0$	$-\frac{\pi}{3}+2k\pi < x < \frac{\pi}{2}+2k\pi \ \vee$ $\frac{4}{3}\pi+2k\pi < x < \frac{3}{2}\pi+2k\pi \ \wedge$ $x \neq \frac{\pi}{3}+2k\pi$
35	$\frac{\sqrt{3}\tan x-1}{2\sin x-\sqrt{3}}<0$	$\frac{\pi}{6}+2k\pi < x < \frac{\pi}{3}+2k\pi \ \vee$ $\frac{\pi}{2}+2k\pi < x < \frac{2}{3}\pi+2k\pi \ \vee$ $\frac{7}{6}\pi+2k\pi < x < \frac{3}{2}\pi+2k\pi$

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36	$\frac{\tan x - 3}{\sin x} < 0 \qquad [0 \le x \le 2\pi]$	$0 < x < \frac{\pi}{3} \vee \frac{2}{3}\pi < x < \frac{4}{3}\pi \wedge x \neq \frac{3}{2}\pi$
37	$\frac{1 + \sqrt{2}\cos(x + \frac{\pi}{6})}{\sin x} \le 0$	$\frac{7}{12}\pi + 2k\pi \le x < \pi + 2k\pi \vee \frac{13}{12}\pi + 2k\pi \le x < 2\pi + 2k\pi$
38	$\frac{\sin(x + \frac{\pi}{4})}{\sqrt{3} - 2\cos x} > 0$	$\frac{\pi}{6} + 2k\pi < x < \frac{3}{4}\pi + 2k\pi \vee \frac{7}{4}\pi + 2k\pi < x < \frac{11}{6}\pi + 2k\pi$
39	$\frac{2\cos(x - \frac{\pi}{3}) + \sqrt{3}}{2\cos x - 1} < 0$	$\frac{\pi}{3} + 2k\pi < x < \frac{7}{6}\pi + 2k\pi \vee \frac{3}{2}\pi + 2k\pi < x < \frac{5}{3}\pi + 2k\pi$
40	$\frac{1 - \sin(x - \frac{\pi}{4})}{\cos x + 1} \ge 0$	$x \neq \pi + 2k\pi$
41	$\frac{1 - \cos x}{\sin x \cos x} \ge 0$	$k\pi < x < \frac{\pi}{2} + k\pi$
42	$\frac{\sin x + \cos x}{\tan x - 1} \ge 0$	$\frac{\pi}{4} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \vee \frac{3}{4}\pi + 2k\pi \le x < \frac{5}{4}\pi + 2k\pi \vee \frac{3}{2}\pi + 2k\pi < x \le \frac{7}{4}\pi + 2k\pi$

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43	$\frac{2\sin x - \sin x \cos x}{\tan x} \leq 1$	$x \neq k\pi$
44	$\frac{\cos x + \frac{\sqrt{3}}{2}}{\sin x \cos x + \sin x} \geq 0$	$2k\pi < x \leq \frac{5}{6}\pi + 2k\pi \vee$ $\pi + 2k\pi < x \leq \frac{7}{6}\pi + 2k\pi$
45	$\frac{2\sin x \cos x + \sin x}{\sin x + \cos x} \leq 0$	$\frac{2}{3}\pi + 2k\pi \leq x < \frac{3}{4}\pi + 2k\pi \vee$ $\pi + 2k\pi \leq x \leq \frac{4}{3}\pi + 2k\pi \vee$ $\frac{7}{4}\pi + 2k\pi < x \leq 2\pi + 2k\pi$
46	$\frac{3\sin x - \sqrt{3}\cos x}{2\cos x - 1} \leq 0$	$-\frac{\pi}{3} + 2k\pi < x \leq \frac{\pi}{6} + 2k\pi \vee$ $\frac{\pi}{3} + 2k\pi < x \leq \frac{7}{6}\pi + 2k\pi$
47	$\frac{\sin x + \cos x}{\tan x - \cot x} > 0$	$\frac{\pi}{4} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \vee$ $\pi + 2k\pi < x < \frac{5}{4}\pi + 2k\pi \vee$ $\frac{3}{2}\pi + 2k\pi < x < 2\pi + 2k\pi$
48	$\frac{3\tan x + \sqrt{3}}{\cot x + \sqrt{3}}(2\sin x - 1) < 0$	$2k\pi < x < \frac{\pi}{6} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi < x < \frac{5}{6}\pi + 2k\pi \vee$ $\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$
49	$\frac{\cos\left(\frac{\pi}{4} - x\right)}{4\tan x - (1 - 3\tan x)} < 0$	$-\frac{\pi}{4} + 2k\pi \leq x < \frac{\pi}{4} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi < x < \frac{3}{4}\pi + 2k\pi \vee$ $\frac{5}{4}\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$

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50	$\frac{\sin 2x}{\sin x\,(2\sin x-\sqrt{2})}\leq 0$	$2k\pi < x < \frac{\pi}{4}+2k\pi \vee$ $\frac{\pi}{2}+2k\pi \leq x < \frac{3}{4}\pi+2k\pi \vee$ $\frac{3}{2}\pi+2k\pi \leq x < 2\pi+2k\pi$
51	$\frac{\sin x-\cos x}{\sin x+\cos x}<0$	$2k\pi < x < \frac{\pi}{4}+2k\pi \vee$ $\frac{3}{4}\pi+2k\pi < x < \frac{5}{4}\pi+2k\pi \vee$ $\frac{7}{4}\pi < x < 2(k+1)\pi$
52	$\frac{(\cos x+1)(2\sin x+1)}{\cos x-\frac{\sqrt{3}}{3}\sin x}<0$	$\frac{\pi}{3}+2k\pi < x < \frac{7}{6}\pi+2k\pi \vee$ $\frac{4}{3}\pi+2k\pi < x < \frac{11}{6}\pi+2k\pi \wedge$ $x \neq \pi+2k\pi$

con disequazioni di grado superiore al primo

53	$\frac{2sinx-\sqrt{2}}{cos^2x+1}<0$	$2k\pi \leq x < \frac{\pi}{4}+2k\pi$ $\frac{3}{4}\pi+2k\pi < x < \pi+2k\pi$
54	$\frac{sin^2x}{\sqrt{2}cosx-1}>0$	$-\frac{\pi}{4}+2k\pi < x < \frac{\pi}{4}+2k\pi \wedge$ $x \neq 2k\pi$
55	$\frac{4cos^2x-1}{cosx}<0$	$\frac{\pi}{3}+2k\pi < x < \frac{\pi}{2}+2k\pi$ $\frac{2}{3}\pi+2k\pi < x < \frac{4}{3}\pi+2k\pi$ $\frac{3}{2}\pi+2k\pi < x < \frac{5}{3}\pi+2k\pi$
56	$\frac{2sin^2x+1}{cos2x}<0$	$\frac{\pi}{4}+k\pi < x < \frac{3}{4}\pi+k\pi$

57	$\frac{1}{cotx}+\frac{1}{tanx}<\frac{4}{3}$	$\frac{\pi}{2}+k\pi<x<\pi+k\pi$
58	$\frac{2sin^2x-11sinx+5}{cosx}\geq 0$	$\frac{\pi}{2}+2k\pi<x\leq\frac{5}{6}\pi+2k\pi$ $\frac{3}{2}\pi+2k\pi<x\leq\frac{13}{6}\pi+2k\pi$
59	$\frac{1}{sin^2x}+\frac{2}{tanx}\geq 0$	$x\neq k\frac{\pi}{2}$
60	$\frac{1}{cosx+1}-\frac{cosx}{cosx-1}>0$	$2k\pi<x\leq 2\pi+2k\pi\wedge$ $x\neq\pi+2k\pi$
61	$\frac{cos2x}{\sqrt{2}+sinx}\geq 0$	$-\frac{\pi}{4}+k\pi\leq x\leq\frac{\pi}{4}+k\pi$
62	$\frac{sinx+cosx}{cos2x}<1$	$\frac{\pi}{4}+2k\pi<x<\frac{5}{4}\pi+2k\pi$ $\frac{3}{2}\pi+2k\pi<x<2\pi+2k\pi$ $x\neq\frac{3}{4}\pi+k\pi$
63	$\frac{1-sin\,x}{1-2\,cos\,2x}\geq 0$	$\frac{\pi}{6}+k\pi<x<\frac{5}{6}\pi+k\pi$

64	$\frac{4cot^2 x - 3(1 + cot^2 x)}{2\,cos^2 x - 1} \geq 0$	$-\frac{\pi}{6} + k\pi \leq x \leq \frac{\pi}{6} + k\pi \wedge x \neq \pi + k\pi \vee \frac{\pi}{4} + k\pi < x < \frac{3}{4}\pi + k\pi$
65	$\frac{1 - cos\,x}{cos\,2x} \geq 0$	$-\frac{\pi}{4} + k\pi < x < \frac{\pi}{4} + k\pi$
66	$\frac{cot\,x}{1 - tan^2 x} < 0$	$\frac{\pi}{4} + k\pi < x < \frac{\pi}{2} + k\pi \vee \frac{3}{4}\pi + k\pi < x < \pi + k\pi$
67	$\frac{sin^2 x + cos^2 x}{sin\,x - cos\,x} > 0$	$\frac{\pi}{4} + 2k\pi < x < \frac{5}{4}\pi + 2k\pi$
68	$\frac{4\,cos^2 x - 1}{cos\,x} < 0$	$\frac{\pi}{3} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \vee \frac{2}{3}\pi + 2k\pi < x < \frac{4}{3}\pi + 2k\pi \vee \frac{3}{2}\pi + 2k\pi < x < \frac{5}{3}\pi + 2k\pi$
69	$\frac{sin\,x + 1}{tan^2 x} \geq -1$	$\forall x \in R$

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70	$\frac{4\sin x}{3-4\sin^2 x} \geq 0$	$\frac{\pi}{3}+2k\pi < x < \frac{2}{3}\pi+2k\pi \vee$ $\pi+2k\pi \leq x < \frac{4}{3}\pi+2k\pi \vee$ $\frac{5}{3}\pi+2k\pi < x \leq 2\pi+2k\pi$
71	$\frac{\sin x\,(2\sin x-1)}{2\cos^2 x} \geq 0$	$\frac{\pi}{6}+2k\pi \leq x \leq \frac{5}{6}\pi+2k\pi \wedge$ $x \neq \frac{\pi}{2}+2k\pi \vee$ $\pi+2k\pi \leq x \leq 2\pi+2k\pi \wedge$ $x \neq \frac{3}{2}\pi+2k\pi$
72	$\frac{\sin x\cos x}{2\cos^2 x-1} \geq 0$	$k\pi \leq x < \frac{\pi}{4}+k\pi \vee$ $\frac{\pi}{2}+k\pi \leq x < \frac{3}{4}\pi+k\pi \vee$ $\pi+k\pi \leq x < \frac{5}{4}\pi+k\pi \vee$ $\frac{3}{2}\pi+k\pi \leq x < \frac{7}{4}\pi+k\pi$
73	$\frac{\sin x-2\sin^2 x}{2\sin x-1} \leq 0$	$2k\pi \leq x \leq \pi+2k\pi \wedge$ $x \neq \frac{\pi}{6}+2k\pi \wedge$ $x \neq \frac{5}{6}\pi+2k\pi$
74	$\frac{\cos^2 x-\sin^2 x}{\cos x\cos 3x} < 0$	$\frac{\pi}{6}+k\pi < x < \frac{\pi}{4}+k\pi \vee$ $\frac{3}{4}\pi+k\pi < x < \frac{5}{6}\pi+\kappa\pi$
75	$\frac{2\cos^2 x-\cos x}{\sin x} > 0$	$2k\pi < x < \frac{\pi}{3}+2k\pi \vee$ $\frac{\pi}{2}+2k\pi < x < \pi+2k\pi \vee$ $\frac{3}{2}\pi+2k\pi < x < \frac{5}{3}\pi+2k\pi$

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76	$\dfrac{\cos x - \frac{1}{2}}{2\sin^2 x - 1} \leq 0$	$-\frac{\pi}{4} + 2k\pi < x < \frac{\pi}{4} + 2k\pi \vee$ $\frac{\pi}{3} + 2k\pi \leq x < \frac{3}{4}\pi + 2k\pi \vee$ $\frac{5}{4}\pi + 2k\pi < x \leq \frac{5}{3}\pi + 2k\pi$
77	$\dfrac{\tan^2 x - \tan x}{4\sin^2 x - 1} > 0$	$2k\pi < x < \frac{\pi}{6} + 2k\pi \vee$ $\frac{\pi}{4} + 2k\pi < x < \frac{5}{6}\pi + 2k\pi \vee$ $\frac{5}{4}\pi + 2k\pi < x < \frac{17}{6}\pi + 2k\pi$
78	$\dfrac{3 - 4\cos^2 x}{2\sin 2x - \sqrt{2}} < 0$	$\frac{\pi}{8} + k\pi < x < \frac{\pi}{6} + k\pi \vee$ $\frac{3}{8}\pi + k\pi < x < \frac{5}{6}\pi + k\pi$
79	$\dfrac{1 - 3\cot^2 x}{2\cos x - 1} < 0 \qquad [0 < x < 2\pi]$	$0 < x < \frac{2}{3}\pi \ \vee$ $\frac{4}{3}\pi < x < 2\pi \ \wedge$ $x \neq \frac{5}{3}\pi \wedge x \neq \frac{\pi}{3}$
80	$\dfrac{4\cos^2 x - 3}{2\sin x - 1} > 0$	$\frac{7}{6}\pi + 2k\pi < x < \frac{11}{6}\pi + 2k\pi$
81	$\dfrac{4\sin^2 x - 1}{2\cos x} \geq 0$	$\frac{\pi}{6} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \ \vee$ $\frac{5}{6}\pi + 2k\pi \leq x < \frac{7}{6}\pi + 2k\pi \ \vee$ $\frac{3}{2}\pi + 2k\pi < x \leq \frac{11}{6}\pi + 2k\pi$
82	$\dfrac{\sqrt{3}\sin x + \cos x}{\cos^2 x - \cos x} \leq 0$	$2k\pi < x < \frac{\pi}{2} + 2k\pi \vee$ $\frac{5}{6}\pi + 2k\pi \leq x < \frac{3}{2}\pi + 2k\pi \vee$ $\frac{11}{6}\pi + 2k\pi \leq x < 2\pi + 2k\pi$

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83	$\frac{sin^2 x + 2\,cos\,x - 2}{3 - cos^2 x - sin\,x} \geq 0$	$x = 2k\pi$
84	$\frac{4\,sin^2 x - 11\,sin\,x + 3 + 2(1 - sin^2 x)}{cos\,x} \geq 0$	$-\frac{\pi}{2} + 2k\pi < x \leq \frac{\pi}{6} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi < x \leq \frac{5}{6}\pi + 2k\pi$
85	$\frac{\sqrt{2}\,tan\,x}{1 - sin^3 x} > 0$	$k\pi < x < \frac{\pi}{2} + k\pi$
86	$\frac{sin^2 x - 2}{cos\,x} < 0$	$-\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$
87	$\frac{2\,sin^2 x + 1}{cos\,2x} < 0$	$\frac{\pi}{4} + k\pi < x < \frac{3}{4}\pi + k\pi$
88	$\frac{cos\,2x + cos\,x - 1}{cos\,2x} > 2$	$-\frac{3}{4}\pi + 2k\pi < x < -\frac{\pi}{2} + 2k\pi \vee$ $-\frac{\pi}{3} + 2k\pi < x < -\frac{\pi}{4} + 2k\pi \vee$ $\frac{\pi}{4} < x < \frac{\pi}{3} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi < x < \frac{3}{4}\pi + 2k\pi$

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89	$\frac{sin\,2x\,(3-4\,sin^2\,x)}{sin\,x} \geq 0$	$2k\pi < x \leq \frac{\pi}{3} + 2k\pi \vee$ $\frac{\pi}{2} + 2k\pi \leq x \leq \frac{2}{3}\pi + 2k\pi \vee$ $\frac{4}{3}\pi + 2k\pi \leq x \leq \frac{3}{2}\pi + 2k\pi \vee$ $\frac{5}{3}\pi + 2k\pi \leq x < 2\pi + 2k\pi$
90	$\frac{2\,cos\frac{x}{2} - 1}{1 + sin\,x} > 0$	$-\frac{2}{3}\pi + 4k\pi < x < \frac{2}{3}\pi + 4k\pi \wedge$ $x \neq \frac{3}{2}\pi + 4k\pi$
91	$\frac{\sqrt{3}\,cot\,x}{cos(2x)} > 0$	$k\pi < x < \frac{\pi}{4} + k\pi \vee$ $-\frac{\pi}{2} + k\pi < x < -\frac{\pi}{4} + k\pi$
92	$\frac{tan^2\,2x}{cot\,2x} > 0$	$k\pi < x < \frac{\pi}{4} + k\pi \vee$ $-\frac{\pi}{2} + k\pi < x < -\frac{\pi}{4} + k\pi$

disequazioni più impegnative

93	$\frac{1 + sin^2\left(x + \frac{\pi}{3}\right)}{1 - cot^2\left(\frac{\pi}{6} - x\right)} > 0$	$-\frac{7}{12}\pi + k\pi < x < -\frac{\pi}{12} + k\pi$

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94	$\frac{\sin x\,(2\sin x+1)}{\frac{\cos^2 x-\sin^2 x}{\cos^2 x}}\geq 0$	$2k\pi \leq x < \frac{\pi}{4}+2k\pi \ \vee$ $\frac{3}{4}\pi+2k\pi < x \leq \pi+2k\pi \vee$ $\frac{7}{6}\pi+2k\pi \leq x < \frac{5}{4}\pi+2k\pi \ \vee$ $\frac{7}{4}\pi+2k\pi < x \leq \frac{11}{6}\pi+2k\pi \vee$ $\frac{\pi}{2}+k\pi$
95	$\frac{\cos x}{1+\cos x} > tan^2\frac{x}{2}$	$-\frac{\pi}{3}+2k\pi < x < \frac{\pi}{3}+2k\pi$
96	$\frac{sin\left(\frac{\pi}{2}-x\right)}{1+cos\left(\frac{\pi}{2}-x\right)} > 2-cot\left(\frac{\pi}{2}-x\right)$	$\frac{\pi}{3}+2k\pi < x < \frac{\pi}{2}+2k\pi \ \vee$ $\frac{3}{2}\pi+2k\pi < x < \frac{5}{3}\pi+2k\pi$
97	$\frac{\sqrt{3}\sin x+\cos x\,(\cos x-1)}{\cos^2 x}\leq 1$	$-\frac{5}{6}\pi+2k\pi \leq x \leq \frac{\pi}{6}+2k\pi \wedge$ $x \neq \frac{3}{2}\pi+2k\pi$
98	$\frac{\sin 2x-\tan x}{\frac{\cos^2 x+3\sin^2 x}{\sin^2 x}}\leq 0$	$\frac{\pi}{4}+k\frac{\pi}{2} \leq x < \frac{\pi}{2}+k\frac{\pi}{2}$

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99	$\frac{1-\sin x-2\cos x}{\cos x}>-\tan x$	$\frac{\pi}{3}+2k\pi<x<\frac{\pi}{2}+2k\pi \vee \frac{3}{2}\pi+2k\pi<x<\frac{5}{3}\pi+2k\pi$
100	$\frac{4\cos^2\frac{x}{2}-2\sin^2\frac{x}{2}-\cos x-2}{1-\sin^2 x}\geq 0$	$2k\pi\leq x\leq\frac{\pi}{3}+2k\pi \vee \frac{5}{3}\pi+2k\pi\leq x\leq 2\pi+2k\pi$
101	$\frac{\lvert\sin x\rvert}{6\cos x+3-4(\cos x+1)}\geq 0$	$-\frac{\pi}{3}+2k\pi<x<\frac{\pi}{3}+2k\pi$
102	$\frac{\lvert\cos x\rvert+1}{4\sin x-2\sqrt{3}}<0$	$2k\pi\leq x<\frac{\pi}{3}+2k\pi \vee \frac{2}{3}\pi+2k\pi<x\leq 2\pi+2k\pi \quad x\neq\pi+2k\pi$
103	$\frac{2\sin^2 x-1}{\lvert\cos x\rvert}>\tan x$	$\frac{\pi}{2}+2k\pi<x<\frac{5}{6}\pi+2k\pi \vee \frac{3}{2}\pi+2k\pi<x<\frac{11}{6}\pi+2k\pi$
104	$\left\lvert\frac{\cos 2x}{\sin x}\right\rvert<1 \quad x\in[0,2\pi]$	$\frac{\pi}{6}<x<\frac{\pi}{2} \vee \frac{\pi}{2}<x<\frac{5}{6}\pi \vee \frac{7}{6}\pi<x<\frac{3}{2}\pi \vee \frac{3}{2}\pi<x<\frac{11}{6}\pi$

105	$\frac{\cos x}{\sqrt{2\cos x - 1}} > \frac{1}{\sqrt{2}}$	$-\frac{\pi}{3} + 2k\pi < x < \frac{\pi}{3} + 2k\pi$
106	$\tan\frac{1}{x^2+1} \geq 1$	$-\sqrt{\frac{4-\pi}{\pi}} \leq x \leq \sqrt{\frac{4-\pi}{\pi}}$
107	$\frac{2\tan\frac{x}{2} + \frac{\sin x}{1+\cos x} - \sqrt{3}}{1-\sin x} > 0$	$\frac{\pi}{3} + 2k\pi < x < \pi + 2k\pi \ \wedge$ $x \neq \frac{\pi}{2} + 2k\pi$
108	$\frac{4\tan x - \frac{1}{\cos^2 x}}{\lvert 16x^2 - 24\pi x + 5\pi^2 \rvert} > 0$	$\frac{\pi}{12} + k\pi < x < \frac{5}{12}\pi + k\pi \wedge$ $x \neq \frac{\pi}{4} \wedge x \neq \frac{5}{4}\pi$
109	$\left\lvert \frac{\tan 2x}{\cot x} \right\rvert < 1$	$-\frac{\pi}{6} + k\pi < x < \frac{\pi}{6} + k\pi \ \wedge$ $x \neq k\pi$
110	$\frac{\cos 2\sqrt{x} - \sin\sqrt{x}}{\sin 2\sqrt{x} - \sin\sqrt{x}} \leq 0 \quad x \in [0, 4\pi^2]$	$\frac{\pi^2}{36} < x < \frac{\pi^2}{9} \vee$ $\frac{25}{36}\pi \leq x \leq \pi^2 \vee$ $\frac{25}{9}\pi^2 \leq x \leq 4\pi^2$

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111	$\frac{4\,sin^2x-3}{sin\,x}>2\frac{cosx}{\lvert sin\,x\rvert}$	$\frac{2}{5}\pi+2k\pi<x<\frac{4}{5}\pi+2k\pi \vee$ $-\pi+2k\pi<x<-\frac{3}{5}\pi+2k\pi \vee$ $-\frac{1}{5}\pi+2k\pi<x<2k\pi$
112	$\frac{1-sin\,x}{1-2sin\,x}<\frac{1+sin\,x}{1-4sin^2x}$	$2k\pi<x<\frac{\pi}{6}+2k\pi \vee$ $\frac{5}{6}\pi+2k\pi<x<\pi+2k\pi \vee$ $\pi+2k\pi<x<\frac{7}{6}\pi+2k\pi \vee$ $\frac{11}{6}\pi+2k\pi<x<2\pi+2k\pi$
113	$\frac{1+\lvert sin\,x\rvert}{tan\,x}<0$	$-\frac{\pi}{2}+k\pi<x<k\pi$
114	$\frac{\sqrt{sin\,x}}{\lvert cos(2x)\rvert}>0$	$\frac{\pi}{4}+2k\pi<x<\frac{3}{4}\pi+2k\pi \vee$ $2k\pi<x<\frac{\pi}{4}+2k\pi \vee$ $\frac{3}{4}\pi+2k\pi<x<\pi+2k\pi$
115	$\frac{-cos^2\,x-3}{2\,cos^2\,x}>\frac{cos\,x}{1-2\,cos^2\,x}$	$\frac{\pi}{4}+\kappa\pi<x<\frac{3}{4}\pi+\kappa\pi$
116	$\frac{1+\lvert 2\,sin\,x\rvert}{1+2\,sin\,x}>0$	$2k\pi\leq x<\frac{7}{6}\pi+2k\pi \vee$ $\frac{11}{6}\pi+2k\pi<x<\pi+2k\pi$

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117	$\frac{1-2\lvert\sin x\rvert}{1+\sin x}>0$	$-\frac{\pi}{6}+2k\pi<x<\frac{\pi}{6}+2k\pi \vee \frac{5}{6}+2k\pi<x<\frac{7}{6}\pi+2k\pi$
118	$\frac{2+\cos^2 x+\cot^2 x}{\cos x+\sin x}<1$	$-\pi+2k\pi<x<-\frac{\pi}{4}+2k\pi \vee \frac{3}{4}\pi+2k\pi<x<\pi+2k\pi$
119	$\frac{2\lvert\sin x\rvert-1}{2\sin x-1}>0 \qquad [0\le x\le 2\pi]$	$0\le x<\frac{7}{6}\pi \vee \frac{11}{6}\pi<x\le 2\pi \wedge x\neq\frac{\pi}{6}\wedge x\neq\frac{5}{6}\pi$
120	$\frac{2\sin x+\sqrt{3}}{\lvert\cos x\rvert}\le 0$	$\frac{4}{3}\pi+2k\pi\le x<\frac{3}{2}\pi+2k\pi \vee \frac{2}{3}\pi+2k\pi<x\le\frac{5}{3}\pi+2k\pi$
121	$\frac{1-2\lvert\sin x\rvert}{2\sin x+1}>0 \qquad [0<x<2\pi]$	$0<x\frac{\pi}{6}\vee \frac{5}{6}\pi<x<2\pi \wedge x\neq\frac{7}{6}\pi\wedge x\neq\frac{11}{6}\pi$
122	$\frac{2\lvert\sin x\rvert+\sqrt{3}}{\cos x}>0$	$-\frac{\pi}{2}+2k\pi<x<\frac{\pi}{2}+2k\pi$
123	$\frac{1-\lvert 2\sin x\rvert}{1+\sin x}>0$	$-\frac{\pi}{6}+2k\pi<x<\frac{\pi}{6}+2k\pi \vee \frac{5}{6}\pi+2k\pi<x<\frac{7}{6}+2k\pi$

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124	$\frac{\sin 5x + \sin 3x}{\sin 4x} > 0$	$-\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{2} + 2k\pi \ \wedge$ $x \neq \frac{\pi}{4} + 2k\pi \ \wedge \ x \neq 2k\pi$
125	$\frac{\sin x}{1 + \cos x} > 2 - \cot x$	$2k\pi < x < 2k\pi + \frac{\pi}{6} \ \vee$ $\frac{5}{6} + 2k\pi < x < \pi + 2k\pi$
126	$\frac{\cos 7x - \cos 3x}{\sin x \cos x} > 0$	$\frac{\pi}{5} + \frac{2}{5}k\pi < x < \frac{2}{5}\pi + \frac{4}{5}k\pi \ \wedge$ $x \neq 2k\pi$
127	$\frac{\frac{\sin x}{\cos x} + \sqrt{3}}{2\cos^2 x - 1} \leq 0$	$\frac{\pi}{4} + k\pi < x < \frac{\pi}{2} + k\pi \ \vee$ $\frac{2}{3}\pi + k\pi < x < \frac{3}{4}\pi + k\pi$
128	$\frac{1}{\cot x} + \frac{1}{\tan x} < \frac{4}{3}$	$\frac{\pi}{2} + k\pi < x < \pi + k\pi$
129	$\frac{\sin 6x - \sin 2x}{(\cos 2x + \sin 2x)(\cos 2x - \sin 2x)} \geq 0$	$k\pi \leq x \leq \frac{\pi}{2} + k\pi \ \wedge$ $x \neq \frac{\pi}{8} + k\frac{\pi}{4}$

130	$\frac{2\,sin\,x\,cos^2\,x}{cos\,3x+cos\,x}\geq 0$	$k\frac{\pi}{2}\leq x<\frac{\pi}{4}+k\frac{\pi}{2}\ \wedge\ x\neq\frac{\pi}{2}+k\pi$