

## Esercizi di riepilogo

Risolvere le seguenti disequazioni.

**86**  $\operatorname{tg} x - \operatorname{tg}^3 x \leq 0$

$$\frac{\pi}{4} + k\pi \leq x < \frac{\pi}{2} + k\pi; \quad \frac{3}{4}\pi + k\pi \leq x \leq \pi + k\pi$$

**87**  $\operatorname{tg} \frac{x}{2} - \operatorname{tg} x > 0$

$$-\frac{\pi}{2} + k\pi < x < \frac{\pi}{2} + k\pi$$

**88**  $\operatorname{tg} x (2 \operatorname{sen} x - \sqrt{3}) > 0$

$$\frac{\pi}{3} + 2k\pi < x < \frac{\pi}{2} + 2k\pi; \quad \frac{2}{3}\pi + 2k\pi < x < \pi + 2k\pi; \quad \frac{3}{2}\pi + 2k\pi < x < 2\pi + 2k\pi$$

**89**  $2 \operatorname{sen} x \cos x - \cos x \geq 0$

$$\frac{\pi}{6} + 2k\pi \leq x \leq \frac{\pi}{2} + 2k\pi; \quad \frac{5}{6}\pi + 2k\pi \leq x \leq \frac{3}{2}\pi + 2k\pi$$

**90**  $\sqrt{2} \operatorname{sen} x \cos x - \operatorname{sen} x \leq 0$

$$\frac{\pi}{4} + 2k\pi \leq x \leq \pi + 2k\pi; \quad -\frac{\pi}{4} + 2k\pi \leq x \leq \frac{3}{4}\pi + 2k\pi$$

**91**  $\operatorname{sen}^2 \frac{x}{2} + \cos x < \cos^2 x$

$$\frac{2}{3}\pi + 2k\pi < x < \frac{4}{3}\pi + 2k\pi$$

**92**  $\cos 3x - \cos 2x \leq 0$

$$k \cdot 4\pi \leq x \leq \frac{2}{5}\pi + k \cdot 4\pi; \quad \frac{4}{5}\pi + k \cdot 4\pi \leq x \leq \frac{6}{5}\pi + k \cdot 4\pi$$

$$\frac{8}{5}\pi + k \cdot 4\pi \leq x \leq \frac{12}{5}\pi + k \cdot 4\pi; \quad \frac{14}{5}\pi + k \cdot 4\pi \leq x \leq \frac{16}{5}\pi + k \cdot 4\pi; \quad \frac{18}{5}\pi + k \cdot 4\pi \leq x \leq 4\pi + k \cdot 4\pi$$

**93**  $(1 + \operatorname{sen} x) (\operatorname{sen}^2 x - \cos^2 x) > 0$

$$\frac{\pi}{4} + k\pi < x < \frac{3}{4}\pi + k\pi; \quad x \neq -\frac{\pi}{2} + k\pi$$

**94**  $\operatorname{sen} x (\operatorname{tg} x - \operatorname{ctg} x) \geq 0$

$$\frac{\pi}{4} + 2k\pi \leq x < \frac{\pi}{2} + 2k\pi$$

$$\frac{3}{4}\pi + 2k\pi \leq x \leq \frac{5}{4}\pi + 2k\pi; \quad x \neq \pi + 2k\pi; \quad -\frac{\pi}{2} + 2k\pi < x \leq -\frac{\pi}{4} + 2k\pi$$

**95**  $\operatorname{ctg} x - \operatorname{sen} 2x > 0$

$$\frac{k\pi}{2} < x < \frac{\pi}{4} + k\pi$$

**96**  $(3 - \operatorname{tg}^2 x) (2 \cos 2x + 1) \leq 0$

$$x = \frac{\pi}{3} + k\pi; \quad x = \frac{2}{3}\pi + k\pi$$

**97**  $(2 \operatorname{sen}^2 x - \sqrt{2} \operatorname{sen} x)(1 - 3 \operatorname{tg}^2 x) \geq 0$

$$\frac{\pi}{6} + 2k\pi \leq x \leq \frac{\pi}{4} + 2k\pi; \quad \frac{3}{4}\pi + 2k\pi \leq x \leq \frac{5}{6}\pi + 2k\pi$$

$$\pi + 2k\pi \leq x \leq \frac{7}{6}\pi + 2k\pi; \quad \frac{11}{6}\pi + 2k\pi \leq x \leq 2\pi + 2k\pi$$

**98**  $\frac{5}{4} \operatorname{sen}^2 x + \frac{1}{4} \operatorname{sen}^2 2x > \cos 2x$

$$\frac{\pi}{6} + k\pi < x < \frac{5}{6}\pi + k\pi$$

**99**  $(2 \cos^2 x - \operatorname{sen}^2 2x) \cos \left( x - \frac{\pi}{6} \right) \leq 0$

$$\frac{\pi}{4} + 2k\pi \leq x \leq \frac{2}{3}\pi + 2k\pi; \quad \frac{3}{4}\pi + 2k\pi \leq x \leq \frac{5}{4}\pi + 2k\pi$$

$$\frac{5}{3}\pi + 2k\pi \leq x \leq \frac{7}{4}\pi + 2k\pi; \quad x = \frac{3}{2}\pi + 2k\pi$$

**100**  $\left( \cos^2 \frac{x}{2} + \cos x - \frac{1}{2} \right) \operatorname{ctg} x \geq 0$

$$2k\pi < x < \pi + 2k\pi; \quad x = \frac{3}{2}\pi + 2k\pi$$

**101**  $\operatorname{sen} 3x + \sqrt{3} \cos \frac{3}{2}x > 2 \cos^2 \frac{3}{2}x + \sqrt{3} \operatorname{sen} \frac{3}{2}x$

$$\frac{\pi}{9} + \frac{4}{3}k\pi < x < \frac{\pi}{6} + \frac{4}{3}k\pi$$

$$\frac{5}{6}\pi + \frac{4}{3}k\pi < x < \frac{11}{9}\pi + \frac{4}{3}k\pi$$

$$102 \quad \text{sen}^2 x - 3 \cos^2 x \leq \text{sen } x + \sqrt{3} \cos x$$

$$103 \quad \sqrt{3} \text{sen} \frac{x}{2} > \text{sen } x$$

$$104 \quad \text{sen } x + \cos x < 1 + \text{sen } 2x$$

$$105 \quad \left[ \text{sen} \left( \frac{\pi}{6} - x \right) + \text{sen} \left( \frac{\pi}{6} + x \right) - \text{sen } 2x \right] (1 - \text{tg } x) \geq 0$$

$$106 \quad \frac{\text{sen } x}{\text{sen } x + 1} > 1$$

$$107 \quad 1 - \frac{1}{\text{tg } x} > 0$$

$$108 \quad \frac{1 + \text{sen}^2 \left( x + \frac{\pi}{3} \right)}{1 - \text{ctg}^2 \left( \frac{\pi}{6} - x \right)} > 0$$

$$109 \quad \frac{\cos x}{1 + \text{sen } x} + \text{tg } x > 2$$

$$110 \quad \frac{\text{tg}^2 x}{\text{tg } x + 1} < -2$$

$$111 \quad \frac{\text{ctg } x}{\text{tg}^2 x - 1} < 0$$

$$112 \quad \text{tg}^2 \frac{x}{2} + \cos x > 1$$

$$113 \quad \frac{\text{ctg} \frac{x}{2}}{1 + \cos x} > 1$$

$$114 \quad \frac{1 + \cos x}{1 - \cos x} > \frac{\sqrt{3}}{\text{tg} \frac{x}{2}}$$

$$115 \quad \frac{\text{sen } 2x - \text{tg } x}{\text{ctg}^2 x + 3} \leq 0$$

$$116 \quad \frac{1 + \text{sen}^2 \left( 2x - \frac{\pi}{6} \right)}{\text{tg} \left( x - \frac{\pi}{3} \right) - 1} > 0$$

$$117 \quad \frac{\text{sen} \left( 3x + \frac{\pi}{6} \right)}{1 + \cos \left( 3x + \frac{\pi}{6} \right)} \leq 1$$

$$\frac{2}{3}\pi + 2k\pi \leq x \leq \frac{7}{6}\pi + 2k\pi; \quad -\frac{\pi}{3} + 2k\pi \leq x \leq \frac{\pi}{2} + 2k\pi$$

$$-\frac{\pi}{3} + 4k\pi < x < 4k\pi; \quad \frac{\pi}{3} + 4k\pi < x < 2\pi + 4k\pi$$

$$2k\pi < x < \frac{\pi}{2} + 2k\pi; \quad \frac{3}{4}\pi + 2k\pi < x < \frac{7}{4}\pi + 2k\pi$$

$$\frac{\pi}{4} + 2k\pi \leq x \leq \frac{5}{6}\pi + 2k\pi;$$

$$\frac{5}{4}\pi + 2k\pi \leq x \leq \frac{13}{6}\pi + 2k\pi; \quad x \neq \frac{\pi}{2} + k\pi$$

impossibile

$$\frac{\pi}{4} + k\pi < x < \frac{\pi}{2} + k\pi; \quad \frac{\pi}{2} + k\pi < x < \pi + k\pi$$

$$-\frac{7}{12}\pi + k\pi < x < -\frac{\pi}{12} + k\pi$$

$$\frac{\pi}{3} + k \cdot 2\pi < x < \frac{\pi}{2} + k \cdot 2\pi; \quad \frac{3}{2}\pi + k \cdot 2\pi < x < \frac{5}{3}\pi + k \cdot 2\pi$$

$$\frac{\pi}{2} + k\pi < x < \frac{3}{4}\pi + k\pi$$

$$k \frac{\pi}{2} < x < \frac{\pi}{4} + k \frac{\pi}{2}$$

$$\frac{\pi}{2} + 2k\pi < x < \frac{3}{2}\pi + 2k\pi; \quad x \neq \pi + 2k\pi$$

$$2k\pi < x < \pi + 2k\pi; \quad x \neq \frac{\pi}{2} + 2k\pi$$

$$-\pi + 2k\pi < x < \frac{\pi}{3} + 2k\pi; \quad x \neq 2k\pi$$

$$\frac{\pi}{4} + k \frac{\pi}{2} \leq x < \frac{\pi}{2} + k \frac{\pi}{2}$$

$$\frac{7}{12}\pi + k\pi < x < \frac{5}{6}\pi + k\pi$$

$$-\frac{7}{18}\pi + k \frac{2}{3}\pi < x \leq \frac{\pi}{9} + k \frac{2}{3}\pi$$

$$118 \quad \frac{\sqrt{3} - 2 \operatorname{sen}\left(x - \frac{\pi}{3}\right)}{\operatorname{tg} x} < 0$$

$$119 \quad \frac{2 \operatorname{sen}^2 x - 11 \operatorname{sen} x + 5}{\cos x} \geq 0$$

$$120 \quad \frac{\operatorname{sen} x - \operatorname{tg} x}{4 + \operatorname{tg}^2 x} \leq 0$$

$$121 \quad \frac{\operatorname{ctg}\left(x - \frac{\pi}{4}\right) - \sqrt{3}}{\operatorname{sen} x - \cos x} \geq 0$$

$$122 \quad \frac{3 \operatorname{sen}^2 x - \cos^2 x}{2 \cos^2 x - 3 \cos x + 1} \leq 0$$

$$123 \quad \frac{1}{\operatorname{sen} x} + \frac{1}{\cos x} < \frac{2}{\operatorname{sen} 2x}$$

$$124 \quad \frac{\operatorname{sen} x + \cos x}{2 \operatorname{sen} 2x + 1} \geq 0$$

$$125 \quad \frac{\sqrt{3} \operatorname{sen} x + \cos x}{\operatorname{sen}^3 x - \cos^3 x} \geq 0$$

$$126 \quad \frac{\operatorname{sen} x \cos x}{\sqrt{3} \cos x + \operatorname{sen} x} \leq 0$$

$$127 \quad \frac{\operatorname{tg} 2x(1 - \cos 2x)}{\operatorname{sen}^2 x - \cos^2 x} \geq 0$$

$$128 \quad \frac{\operatorname{sen}^2 \frac{x}{2}(1 - \cos x)}{\sqrt{3} \operatorname{sen} x - \cos x} \geq 0$$

$$129 \quad \frac{\cos 2x + \operatorname{sen} x}{1 - \sqrt{2} \cos x} > 0$$

$$130 \quad \frac{\operatorname{sen} x + \operatorname{tg} x}{\operatorname{sen}\left(x + \frac{\pi}{4}\right) + \cos\left(x + \frac{\pi}{4}\right)} < 0$$

$$131 \quad \frac{\operatorname{sen} 2x(1 - \operatorname{tg}^2 x)}{\cos 2x + 1} < 0$$

$$132 \quad \frac{\cos x + \sqrt{3} \operatorname{sen} x - \sqrt{3}}{\operatorname{sen} 2x - \cos x} > 0$$

$$\frac{\pi}{2} + 2k\pi < x < \frac{2}{3}\pi + 2k\pi; \quad \frac{3}{2}\pi + 2k\pi < x < 2\pi + 2k\pi$$

$$\frac{\pi}{2} + 2k\pi < x \leq \frac{5}{6}\pi + 2k\pi; \quad \frac{3}{2}\pi + 2k\pi < x \leq \frac{13}{6}\pi + 2k\pi$$

$$k\pi \leq x < \frac{\pi}{2} + k\pi$$

$$-\frac{7}{12}\pi + 2k\pi \leq x \leq \frac{5}{12}\pi + 2k\pi; \quad x \neq \frac{\pi}{4} + k\pi$$

$$-\frac{\pi}{3} + 2k\pi < x \leq -\frac{\pi}{6} + 2k\pi$$

$$\frac{\pi}{6} + 2k\pi \leq x < \frac{\pi}{3} + 2k\pi; \quad \frac{5}{6}\pi + 2k\pi \leq x \leq \frac{7}{6}\pi + 2k\pi$$

$$\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$$

$$-\frac{\pi}{12} + k2\pi < x < \frac{7}{12}\pi + k2\pi$$

$$\frac{3}{4}\pi + k2\pi \leq x < \frac{11}{12}\pi + k2\pi; \quad \frac{19}{12}\pi + k2\pi < x \leq \frac{7}{4}\pi + k2\pi$$

$$\frac{\pi}{4} + k\pi < x \leq \frac{5}{6}\pi + k\pi$$

$$-\frac{\pi}{3} + k2\pi < x \leq k2\pi$$

$$\frac{\pi}{2} + k2\pi \leq x < \frac{2}{3}\pi + k2\pi; \quad \pi + k2\pi \leq x \leq \frac{3}{2}\pi + k2\pi$$

$$-\frac{\pi}{2} + k\pi \leq x \leq k\pi; \quad x \neq -\frac{\pi}{4} + k\pi$$

$$\frac{\pi}{6} + 2k\pi < x < \frac{7}{6}\pi + 2k\pi; \quad x = 2k\pi$$

$$\frac{\pi}{4} + 2k\pi < x < \frac{1}{6}\pi + 2k\pi; \quad x \neq \frac{\pi}{2} + 2k\pi$$

$$\frac{7}{4}\pi + 2k\pi < x < \frac{11}{6}\pi + 2k\pi$$

$$-\pi + 2k\pi < x < 2k\pi; \quad x \neq -\frac{\pi}{2} + 2k\pi$$

$$-\frac{\pi}{4} + k\frac{\pi}{2} < x < k\frac{\pi}{2}$$

$$-\frac{\pi}{2} + 2k\pi < x < \frac{5}{6}\pi + 2k\pi; \quad x \neq \frac{\pi}{2} + 2k\pi; \quad x \neq \frac{\pi}{6} + 2k\pi$$

$$133 \quad \frac{2 - \sqrt{2} \operatorname{sen} x - \sqrt{2} \operatorname{cos} x}{1 + \operatorname{tg} x} \leq 0$$

$$-\frac{\pi}{2} + k\pi < x < -\frac{\pi}{4} + k\pi; \quad x = \frac{\pi}{4} + 2k\pi$$

$$134 \quad \frac{2 \cos^2 \frac{x}{2} - \operatorname{sen} x}{\operatorname{tg} x + 1} < 0$$

$$\frac{3}{4}\pi + 2k\pi < x < \pi + 2k\pi; \quad \frac{3}{2}\pi + 2k\pi < x < \frac{7}{4}\pi + 2k\pi$$

$$135 \quad \frac{\operatorname{cos} x}{1 + \operatorname{sen} x} + \operatorname{tg} x > 2$$

$$-\frac{\pi}{2} + 2k\pi < x < -\frac{\pi}{3} + 2k\pi; \quad \frac{\pi}{3} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$$

$$136 \quad \frac{\operatorname{tg} x + \operatorname{sen} x}{\operatorname{tg} x - \operatorname{sen} x} - 2 \operatorname{cos} x \leq 2$$

$$\frac{\pi}{3} + 2k\pi \leq x \leq \frac{5}{3}\pi + 2k\pi; \quad x \neq \pi + 2k\pi; \quad x \neq \frac{\pi}{2} + k\pi$$

$$137 \quad \frac{\operatorname{sen} 2x + \operatorname{cos} 2x - 1}{\operatorname{sen} \left( 2x - \frac{\pi}{4} \right)} \leq 0$$

$$k\pi \leq x < \frac{\pi}{8} + k\pi; \quad \frac{\pi}{4} + k\pi \leq x < \frac{5}{8}\pi + k\pi$$

$$138 \quad \frac{\operatorname{cos} x \operatorname{sen} x + \operatorname{sen}^2 x}{2 \operatorname{cos} \left( x - \frac{\pi}{3} \right) - 1} \geq 0$$

$$2k\pi < x < \frac{2}{3}\pi + 2k\pi; \quad \frac{3}{4}\pi + 2k\pi \leq x \leq \pi + 2k\pi; \\ \frac{7}{4}\pi + 2k\pi \leq x < 2\pi + 2k\pi$$

$$139 \quad \frac{\operatorname{sen}^2 x - \sqrt{3} \operatorname{sen} x \operatorname{cos} x}{2 \operatorname{sen} \left( x - \frac{\pi}{4} \right) - \sqrt{3}} \geq 0$$

$$2k\pi \leq x \leq \frac{\pi}{3} + 2k\pi; \\ \frac{7}{12}\pi + 2k\pi < x < \frac{11}{12}\pi + 2k\pi; \quad \pi + 2k\pi \leq x \leq \frac{4}{3}\pi + 2k\pi$$

$$140 \quad \frac{(3 - \operatorname{tg}^2 x)(1 - \operatorname{tg}^2 x)}{1 - 3\operatorname{tg}^2 x} \geq 0$$

$$-\frac{\pi}{6} + k\pi < x < \frac{\pi}{6} + k\pi; \quad \frac{\pi}{4} + k\pi \leq x \leq \frac{\pi}{3} + k\pi; \\ \frac{2}{3}\pi + k\pi \leq x \leq \frac{3}{4}\pi + k\pi$$

$$141 \quad \frac{\operatorname{sen} \left( x + \frac{\pi}{8} \right) \operatorname{cos} \left( x + \frac{\pi}{8} \right) - 1}{\operatorname{sen} x + \operatorname{cos} x - 2} > 0$$

$$\forall x \in \mathbb{R}$$

$$142 \quad \frac{2 \operatorname{sen}^2 \frac{x}{2} - \operatorname{sen} 2x + \operatorname{cos} x}{\operatorname{tg}^2 \left( x + \frac{\pi}{4} \right)} > 0$$

$$\forall x \in \mathbb{R}; \quad x \neq \frac{\pi}{4} + k\frac{\pi}{2}$$

$$143 \quad \frac{2 \operatorname{sen} x + \sqrt{3} - 2 \operatorname{cos} x - \sqrt{3} \operatorname{tg} x}{1 - \operatorname{ctg}^2 x} > 0$$

$$-\frac{\pi}{2} + k\pi < x < -\frac{\pi}{4} + k\pi;$$

$$-\frac{\pi}{6} + 2k\pi < x < \frac{\pi}{6} + 2k\pi; \quad x \neq 2k\pi$$

$$144 \quad \frac{\operatorname{sen} 2x - \operatorname{sen} x}{\operatorname{ctg}^2 2x - 1} \leq 0$$

$$\frac{\pi}{8} + 2k\pi < x \leq \frac{\pi}{3} + 2k\pi; \quad \frac{3}{8}\pi + 2k\pi < x < \frac{5}{8}\pi + 2k\pi; \quad x \neq \frac{\pi}{2} + 2k\pi;$$

$$\frac{7}{8}\pi + k\pi < x < \pi + k\pi; \quad \frac{9}{8}\pi + 2k\pi < x < \frac{11}{8}\pi + 2k\pi; \quad \frac{13}{8}\pi + 2k\pi < x \leq \frac{5}{3}\pi + 2k\pi$$

$$145 \quad \frac{\operatorname{ctg} x \operatorname{sen} \left( \frac{\pi}{3} - x \right)}{(\operatorname{tg} x - \sqrt{3})(\operatorname{tg} x + 1)} > 0$$

$$-\frac{\pi}{4} + 2k\pi < x < 2k\pi; \quad \frac{\pi}{2} + 2k\pi < x < \frac{3}{4}\pi + 2k\pi;$$

$$\pi + 2k\pi < x < \frac{3}{2}\pi + 2k\pi; \quad x \neq \frac{4}{3}\pi + 2k\pi$$

$$146 \quad \frac{\operatorname{tg}^4 x - \operatorname{tg}^2 x}{(\operatorname{sen} x - \sqrt{3} \cos x + 1) \cos x} \leq 0$$

$$147 \quad \frac{\operatorname{tg}^2 x}{\operatorname{tg} x + 1} < -2$$

$$148 \quad \frac{1 - 3 \operatorname{ctg}^2 x}{\operatorname{sen} 2x - \sqrt{3} \cos 2x} \geq 0$$

$$149 \quad \frac{\operatorname{tg}^2 2x - 1}{\operatorname{sen} 2x + \cos^2 x} \leq 0$$

$$150 \quad \operatorname{tg}^2 x + \operatorname{tg} x \geq \frac{\operatorname{ctg} x - \operatorname{tg}^2 x}{\operatorname{tg} x - 1} - 1$$

$$151 \quad |\operatorname{sen} x - \cos x| < 1 \quad k\pi < x < \frac{\pi}{2} + k\pi$$

$$152 \quad \left| \frac{1}{\cos x} \right| < 2 \quad -\frac{\pi}{3} + k\pi < x < \frac{\pi}{3} + k\pi$$

$$153 \quad \left| \frac{1}{\operatorname{sen} x} \right| > 2 \quad -\frac{\pi}{6} + k\pi < x < \frac{\pi}{6} + k\pi; x \neq k\pi$$

$$154 \quad |\operatorname{ctg} 3x| > 1 \quad -\frac{\pi}{12} + k\frac{\pi}{3} < x < \frac{\pi}{12} + k\frac{\pi}{3}; x \neq k\frac{\pi}{3}$$

$$155 \quad |2 \cos^2 x - \sqrt{3} \cos x| > 3 \\ \frac{5}{6} \pi + 2k\pi < x < \frac{7}{6} \pi + 2k\pi$$

$$161 \quad \sqrt{\operatorname{ctg} x} \leq \operatorname{ctg} x - 1$$

$$162 \quad \left| \frac{\operatorname{sen} x - 1}{\cos x} \right| < 1$$

$$163 \quad \left| \frac{\cos x}{\operatorname{sen} x - \cos x} \right| \leq 0$$

$$164 \quad \frac{(\sqrt{3} - 2) \cos\left(\frac{\pi}{6} + x\right) - \operatorname{sen}\left(\frac{\pi}{6} + x\right) + 1}{|\operatorname{sen} x - \cos x| - 1} \leq 0$$

$$\frac{\pi}{6} + 2k\pi < x \leq \frac{\pi}{4} + 2k\pi; \frac{\pi}{2} + 2k\pi < x \leq \frac{3}{4} \pi + 2k\pi$$

$$\frac{5}{4} \pi + 2k\pi \leq x \leq \frac{7}{4} \pi + 2k\pi; x \neq \frac{3}{2} \pi + 2k\pi$$

$$-\frac{\pi}{2} + k\pi < x < -\frac{\pi}{4} + k\pi$$

$$\frac{\pi}{3} + k\pi \leq x < \frac{7}{6} \pi + k\pi; x \neq k\pi; x \neq \frac{2}{3} \pi + k\pi$$

$$-\frac{\pi}{8} + k\pi \leq x \leq \frac{\pi}{8} + k\pi; \frac{3}{8} \pi + k\pi \leq x < \frac{\pi}{2} + k\pi$$

$$\frac{5}{8} \pi + k\pi \leq x < \alpha + k\pi; \alpha = \operatorname{arctg}\left(-\frac{1}{2}\right); \frac{3}{4} \pi < \alpha < \pi; x \neq \frac{3}{4} \pi + k\pi$$

$$k\pi < x \leq \frac{3}{4} \pi + k\pi; x \neq \frac{\pi}{2} + k\pi; x \neq \frac{\pi}{4} + k\pi$$

$$156 \quad |\sqrt{3} \operatorname{tg}^2 x - 2 \operatorname{tg} x| < \sqrt{3} \quad -\frac{\pi}{6} + k\pi < x < \frac{\pi}{3} + k\pi$$

$$157 \quad 2 \left| \operatorname{sen}\left(2x - \frac{\pi}{3}\right) \right| - 1 < 0 \quad \frac{\pi}{12} + k\frac{\pi}{2} < x < \frac{\pi}{4} + k\frac{\pi}{2}$$

$$158 \quad \sqrt{2|\cos x|} - 1 \leq 0 \quad \frac{\pi}{3} + k\pi \leq x \leq \frac{2}{3} \pi + k\pi$$

$$159 \quad \sqrt{1 + \operatorname{sen}^2 x} < 1 - \operatorname{sen} x \quad \pi + 2k\pi < x < 2\pi + 2k\pi$$

$$160 \quad \sqrt{\operatorname{sen}^2 x - 3 \cos^2 x} < 2 \operatorname{sen} x + 1 \\ \frac{\pi}{3} + 2k\pi \leq x \leq \frac{2}{3} \pi + 2k\pi$$

$$k\pi < x \leq \alpha + k\pi; \alpha = \operatorname{arccotg} \frac{3 + \sqrt{5}}{2}; 0 < \alpha < \frac{\pi}{2}$$

$$2k\pi < x < \pi + 2k\pi; x \neq \frac{\pi}{2} + 2k\pi$$

$$x = \frac{\pi}{2} + k\pi$$

$$2k\pi < x \leq \frac{\pi}{6} + 2k\pi \quad \frac{\pi}{3} + 2k\pi \leq x < \frac{\pi}{2} + 2k\pi; \pi + 2k\pi < x < \frac{3}{2} \pi + 2k\pi$$