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Facoltà di Scienze
Corso di Laurea in Scienze Biologiche

Corso di recupero per l'assolvimento degli obblighi formativi (OFA) dell'insegnamento di Matematica

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Disequazioni goniometriche

(i) Risolvere le seguenti disequazioni goniometriche:

(1)	$\sin x > \frac{1}{2}$,	$\frac{\pi}{6} + 2k\pi < x < \frac{5}{6}\pi + 2k\pi$
(2)	$\sin x \geq -\frac{\sqrt{2}}{2}$,	$-\frac{\pi}{4} + 2k\pi \leq x \leq \frac{5}{4}\pi + 2k\pi$
(3)	$\sin x < \frac{\sqrt{3}}{2}$,	$-\frac{4}{3}\pi + 2k\pi < x < \frac{\pi}{3} + 2k\pi$
(4)	$\cos x \geq \frac{\sqrt{2}}{2}$,	$-\frac{\pi}{4} + 2k\pi \leq x \leq \frac{\pi}{4} + 2k\pi$
(5)	$\cos x < \frac{1}{2}$,	$\frac{\pi}{3} + 2k\pi < x < \frac{5}{3}\pi + 2k\pi$
(6)	$\operatorname{tg} x \geq \frac{\sqrt{3}}{3}$,	$\frac{\pi}{6} + k\pi \leq x < \frac{\pi}{2} + k\pi$
(7)	$\operatorname{tg} x \leq -1$,	$-\frac{\pi}{2} + k\pi < x \leq -\frac{\pi}{4} + k\pi$
(8)	$\operatorname{tg} x > -\frac{1}{2}$,	$-\operatorname{arctg}\frac{1}{2} + k\pi < x < \frac{\pi}{2} + k\pi$
(9)	$\operatorname{tg} x \leq -3$,	$-\frac{\pi}{2} + k\pi < x \leq -\operatorname{arctg} 3 + k\pi$
(10)	$2\cos\left(\frac{\pi}{4} - 2x\right) - \sqrt{2} < 0$,	$\frac{\pi}{4} + k\pi < x < \pi + k\pi$
(11)	$\sin\left(\frac{\pi}{3} - 3x\right) > -\frac{1}{2}$,	$-\frac{5}{18}\pi + \frac{2}{3}k\pi < x < \frac{\pi}{6} + \frac{2}{3}k\pi$
(12)	$\operatorname{ctg}\left(x + \frac{\pi}{3}\right) \geq 0$,	$-\frac{\pi}{3} + k\pi < x \leq \frac{\pi}{6} + k\pi$

(13) $2\cos^2 x + \cos x > 0$, $\quad \frac{2}{3}\pi + 2k\pi < x < \frac{4}{3}\pi + 2k\pi \vee -\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$

(14) $2\sin^2 x - 3\sin x - 2 < 0$, $\quad -\frac{\pi}{6} + 2k\pi < x < \frac{7}{6}\pi + 2k\pi$

(15) $\cos^2 x + 2\cos x > 0$, $\quad -\frac{\pi}{2} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$

(16) $\operatorname{tg}^2 x - (1+\sqrt{3})\operatorname{tg} x + \sqrt{3} \geq 0$,

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

(17) $\sin^2 x - 2\sin x + 1 > 0$, $\quad x \neq \frac{\pi}{2} + 2k\pi$

(18) $\operatorname{ctg}^2 x + 3\operatorname{ctg} x + 4 \leq 0$, $\quad x \in \emptyset$

(19) $2\sin^2 x + 4\cos^2 x > 5\cos x$, $\quad \frac{\pi}{3} + 2k\pi < x < \frac{5}{3}\pi + 2k\pi$

(20) $\cos x + \sqrt{3}\sin x - \sqrt{3} > 0$, $\quad \frac{\pi}{6} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$

(21) $\sin x - \cos x + \frac{\sqrt{6}}{2} \geq 0$, $\quad -\frac{\pi}{12} + 2k\pi \leq x \leq \frac{19}{12}\pi + 2k\pi$

(22) $2\sin x + \cos x + 1 \geq 0$, $\quad -2\operatorname{arctg}\frac{1}{2} + 2k\pi \leq x \leq \pi + 2k\pi$

(23) $\sin x + 2\cos x + 1 < 0$, $\quad 2\operatorname{arctg} 3 + 2k\pi < x < \frac{3}{2}\pi + 2k\pi$

(24) $2\sqrt{3}\cos^2 x - 2\sin x\cos x < \sqrt{3}$, $\quad \frac{\pi}{6} + k\pi < x < \frac{2}{3}\pi + k\pi$

(25) $3\cos 2x + 2\sqrt{3}\sin x\cos x < 0$, $\quad \frac{\pi}{3} + k\pi < x < \frac{5}{6}\pi + k\pi$

(26) $\operatorname{tg}\frac{x}{2} - \operatorname{tg} x > 0$, $\quad -\frac{\pi}{2} + k\pi < x < k\pi$

(27) $\operatorname{tg} x(2\sin x - \sqrt{3}) > 0$, $\quad \frac{\pi}{3} + 2k\pi < x < \frac{\pi}{2} + 2k\pi$

(28) $\sin^3 x - \sin^2 x\cos x - 3\sin x\cos^2 x + 3\cos^3 x \leq 0$,

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

(29) $\sin^2\frac{x}{2}+\cos x<\cos^2 x,$ $\qquad \frac{2}{3}\pi+2k\pi<x<\frac{4}{3}\pi+2k\pi$

(30) $\dfrac{\cos x}{1+\sqrt{2}\cos\left(x-\frac{\pi}{4}\right)}\le 0,$ $\qquad \frac{\pi}{2}+2k\pi\le x<\pi+2k\pi$

(31) $\dfrac{3\sin^2 x-\cos^2 x}{2\cos^2 x-3\cos x+1}\le 0,$

$$-\frac{\pi}{3}+2k\pi<x\le-\frac{\pi}{6}+2k\pi\vee\frac{\pi}{6}+2k\pi\le x<\frac{\pi}{3}+2k\pi\vee\frac{5}{6}\pi+2k\pi\le x\le\frac{7}{6}\pi+2k\pi$$

(32) $|\sin x-\cos x|<1,$ $\qquad k\pi<x<\frac{\pi}{2}+k\pi$

(33) $|\sqrt{3}\operatorname{tg}^2 x-2\operatorname{tg}x|<\sqrt{3},$ $\qquad -\frac{\pi}{6}+k\pi<x<\frac{\pi}{3}+2k\pi$

(34) $|2\cos^2 x-\sqrt{3}\cos x|>3,$ $\qquad \frac{5}{6}\pi+2k\pi<x<\frac{7}{6}\pi+k\pi$

(35) $\sqrt{\sin^2 x-3\cos^2 x}<2\sin x+1,$ $\qquad \frac{\pi}{3}+2k\pi\le x\le\frac{2}{3}\pi+2k\pi$

(36) $\sqrt{\operatorname{ctg}x}\le\operatorname{ctg}x-1,$ $\qquad k\pi<x\le\operatorname{arctg}\frac{3+\sqrt{5}}{2}+k\pi$