Goniometria

Semplifica le seguenti espressioni:

99. $\frac{2}{3}\operatorname{sen} 90° + 3\operatorname{sen} 180° - 4\operatorname{sen} 270° - \frac{5}{3}\operatorname{sen} 90°$. [3]

100. $2\operatorname{sen}\pi + 4\cos\frac{\pi}{2} - 3\cos 2\pi + 5\operatorname{sen}\frac{\pi}{2} + 2\cos\pi$. [0]

101. $5\cos 90° - 3\cos 0° + 2\cos 180° - \cos 270° + 4\cos 360°$. $[-1]$

102. $2(\cos 180°\operatorname{sen} 270° - \cos 270°\operatorname{sen} 90°) - \cos^2 180° - \operatorname{sen} 270°$. [2]

103. $\dfrac{1 - 2\operatorname{sen} 270°}{4\operatorname{sen} 90° - 7\cos 0° - 3\cos 270° - 6\cos 180°}$. [1]

104. $a^2\cos 0° - 2ab\operatorname{sen} 270° - b^2\cos 180° - a\cos 270°$. $[(a+b)^2]$

105. $7\operatorname{sen} 0° - 2\cos 180° - 5\operatorname{sen} 270° + 4\cos 0° - 11\cos 360°$. [0]

106. $5\operatorname{ctg} 90° + 3\cos 90° - 2\operatorname{tg} 0° + \operatorname{sen} 270° - 2\operatorname{sen} 360°$. $[-1]$

107. $2\cos\frac{3}{2}\pi - \frac{3}{4}\operatorname{sen} 2\pi + 2\operatorname{sen}\frac{3}{2}\pi - \frac{3}{2}\operatorname{tg} 0 + 2\operatorname{sen}\frac{\pi}{2}$. [0]

108. $3\operatorname{sen}\pi - 5\cos\pi + 2\operatorname{tg}\frac{3}{2}\pi - \operatorname{ctg}\pi + 2\operatorname{sen}\frac{3}{2}\pi$. [*Impossibile. Perché?*]

109. $\cos 0 - 2\operatorname{sen}\frac{3}{2}\pi + 3\operatorname{tg}\pi - \operatorname{ctg}\frac{\pi}{2} + \frac{2}{3}\operatorname{tg} 2\pi - \cos\pi$. [4]

110. $-a\operatorname{sen} 270° - b\cos 180° + (a+b)\operatorname{tg} 360°$. $[a+b]$

111. $a^3\cos 360° + b^3\operatorname{sen} 90° + 3a^2b\cos 0° - 3ab^2\cos 180°$. $[(a+b)^3]$

112. $(a-b)^2\cos 180° + (a+b)^2\cos 360° - 2ab\operatorname{tg} 180°$. $[4ab]$

113. $(a+b)^2\operatorname{sen}^2\frac{3}{2}\pi - 4ab\cos^2\pi + a\operatorname{tg}^2 2\pi$. $[(a-b)^2]$

114. $p\operatorname{sen} 270° + q\operatorname{tg} 180° - (p-q)\sec 0°$. $[q-2p]$

115. $\dfrac{(m-n)^2\operatorname{sen}^2\frac{\pi}{2} - 3mn\cos\pi + mn\operatorname{sen}^2\frac{3}{2}\pi}{m\cos 0 - n\cos\pi}$. $[m+n]$

116. $\frac{a^3+b^3}{a+b}\cos 180° - \frac{a^3-b^3}{a-b}\operatorname{sen} 270°$. $[2ab]$

117. $\cos 720° + \operatorname{sen} 540° - \operatorname{sen} 180° - \cos 1080° + \operatorname{sen} 450° - \cos 630° - \operatorname{sen} 720°$. [1]

118. $(a+b)^3\cos 360° - \frac{a^4-b^4}{a-b}\operatorname{sen} 90° + 2ab(a+b)\sec 540°$. [0]

119. $\frac{a^4-b^4}{a-b}\operatorname{sen} 90° + ab(a+b)\cos 540° - a^4\operatorname{tg} 360°$. $[a^3+b^3]$

177. $2\operatorname{tg} 60°\cdot\cos 30° - \operatorname{sen} 30°\cdot\cos 60° - \operatorname{cosec} 30°\cdot\operatorname{tg} 45°$. $\left[\frac{3}{4}\right]$

178. $3\operatorname{ctg} 30° - 3\operatorname{tg} 60° + 6\sqrt{3}\cos 60° + \operatorname{tg} 60°$. $[4\sqrt{3}]$

179. $2\cos\frac{\pi}{6} + \operatorname{ctg}\frac{\pi}{3} - \operatorname{tg}\frac{\pi}{6} + 5\operatorname{sen}\frac{\pi}{4} - \frac{\sqrt{2}}{2}\operatorname{tg}\frac{\pi}{4} - \operatorname{tg}\frac{\pi}{3}$. $[2\sqrt{2}]$

180. $\dfrac{\operatorname{cosec} 30° - a\operatorname{tg} 45° - b}{\operatorname{tg} 45°}\cdot\dfrac{(a+b)\operatorname{sen} 30° + (a-b)\cos 60° - 2a}{\sqrt{3}(a+b)\operatorname{tg} 30° - \sec 60°}$. $[a]$

Angoli complementari.

185. $\operatorname{sen}\alpha \operatorname{sen}(90° - \alpha) - \cos\alpha \cos(90° - \alpha)$. [0]

186. $\left[\operatorname{sen}\alpha \cos\left(\frac{\pi}{2} - \alpha\right) + \operatorname{sen}\left(\frac{\pi}{2} - \alpha\right)\cos\alpha\right] \operatorname{tg}\left(\frac{\pi}{2} - \alpha\right) \operatorname{tg}\alpha$. [1]

187. $[\operatorname{sen}\alpha \operatorname{cosec}(90° - \alpha) + \cos\alpha \sec(90° - \alpha)] \operatorname{sen}(90° - \alpha) \cos(90° - \alpha)$. [1]

188. $\dfrac{\operatorname{sen}^2\left(\frac{\pi}{2} - \alpha\right) - \cos^2\left(\frac{\pi}{2} - \alpha\right)}{\cos\left(\frac{\pi}{2} - \alpha\right)\operatorname{tg}\left(\frac{\pi}{2} - \alpha\right) + \operatorname{sen}\left(\frac{\pi}{2} - \alpha\right)\operatorname{ctg}\left(\frac{\pi}{2} - \alpha\right)}$. [$\cos\alpha - \operatorname{sen}\alpha$]

189. $\dfrac{\operatorname{sen}(90° - \alpha)\cos(90° - \alpha)}{\cos(90° - \alpha)\cos\alpha + \operatorname{sen}^2(90° - \alpha) - \operatorname{sen}\alpha \operatorname{sen}(90° - \alpha)}$. [$\operatorname{tg}\alpha$]

Angoli che differiscono di un angolo retto.

190. $\operatorname{sen}(90° + \alpha) - \cos\alpha - \cos(90° + \alpha) + \cos\alpha \operatorname{ctg}(90° + \alpha) + \operatorname{tg}(90° + \alpha)$. [$-\operatorname{ctg}\alpha$]

191. $\operatorname{sen}\left(\frac{\pi}{2} + \alpha\right) - \operatorname{ctg}\left(\frac{\pi}{2} + \alpha\right) - \cos\alpha - \operatorname{ctg}\left(\frac{\pi}{2} + \alpha\right)$. [$2\operatorname{tg}\alpha$]

192. $\operatorname{sen}(90° + \alpha) \operatorname{tg}(90° + \alpha)(1 + \operatorname{tg}^2\alpha)(-\operatorname{sen}\alpha)$. [1]

193. $\dfrac{\operatorname{cosec}\left(\frac{\pi}{2} + \alpha\right) - \cos\left(\frac{\pi}{2} + \alpha\right)\operatorname{ctg}\left(\frac{\pi}{2} + \alpha\right)}{-\cos\left(\frac{\pi}{2} + \alpha\right)}$. [$\operatorname{ctg}\alpha$]

194. $[1 - \operatorname{sen}^2(90° + \alpha)]\cos^2(90° + \alpha) : \cos^3(90° + \alpha)$. [$-\operatorname{sen}\alpha$]

Angoli supplementari.

195. $\cos^2\alpha + \operatorname{sen}^2(\pi - \alpha) - 1 + \cos(\pi - \alpha) + \cos\alpha$. [0]

196. $2\operatorname{sen}^2(180° - \alpha) + \cos^4\alpha - \operatorname{sen}^4(180° - \alpha) + \operatorname{sen} 90°$. [2]

197. $\operatorname{cosec}(\pi - \alpha)\operatorname{sen}(\pi - \alpha) + \operatorname{sen}(\pi - \alpha)\cos\alpha \sec\alpha$. [$1 + \operatorname{sen}\alpha$]

198. $[\cos^2\alpha \cdot \operatorname{ctg}(\pi - \alpha) - \cos^2(\pi - \alpha)\operatorname{tg}\alpha]\operatorname{tg}\alpha$. [$-1$]

199. $\dfrac{\operatorname{sen}^2\alpha \operatorname{tg}(\pi - \alpha) + \operatorname{ctg}(\pi - \alpha)\operatorname{sen}^2\alpha}{\cos^2\alpha \operatorname{ctg}(\pi - \alpha) + \operatorname{tg}(\pi - \alpha)\cos^2\alpha}$. [$\operatorname{tg}^2\alpha$]

Angoli che differiscono di un angolo piatto.

200. $\operatorname{sen}(180° + \alpha) \cos(180° + \alpha)[\operatorname{tg}\alpha + \operatorname{ctg}(180° + \alpha)] \operatorname{sen}(180° + \alpha)$. [$-\operatorname{sen}\alpha$]

201. $\dfrac{\operatorname{sen}(180° + \alpha)}{\cos(180° + \alpha)} \cdot \operatorname{tg}\alpha[1 + \operatorname{ctg}(180° + \alpha)] - \operatorname{tg}(180° + \alpha)$. [$\operatorname{tg}^2\alpha$]

202. $\dfrac{\operatorname{sen}^2(\pi + \alpha) + \cos^2(\pi + \alpha)}{\cos\alpha} + \cos(\pi + \alpha) + \operatorname{sen}(\pi + \alpha)\operatorname{tg}(\pi + \alpha)$. [0]

203. $\dfrac{\sec(180° + \alpha)}{\operatorname{cosec}\alpha} \cdot \operatorname{cosec}(180° + \alpha)[\operatorname{tg}(180° + \alpha) + \operatorname{ctg}\alpha] \cdot \operatorname{sen}(180° + \alpha)$. $\left[-\dfrac{1}{\cos^2\alpha}\right]$

204. $\left[\dfrac{1 + \cos(180° + \alpha)}{1 - \cos(180° + \alpha)} - \dfrac{1 + 2\cos(180° + \alpha)}{\operatorname{sen}^2(180° + \alpha)}\right] \cdot \operatorname{tg}^2(180° + \alpha)\operatorname{sen}^2(180° + \alpha)$. [$\operatorname{sen}^2\alpha$]

Angoli opposti ed esplementari.

205. $\cos(2\pi-\alpha)\,[\operatorname{sen}(2\pi-\alpha)\cdot\operatorname{tg}(-\alpha)+\cos(-\alpha)]\cdot\sec(-\alpha)$. $\left[\dfrac{1}{\cos\alpha}\right]$

206. $\operatorname{sen}\alpha+\operatorname{tg}(-\alpha)\cdot[\operatorname{sen}(2\pi-\alpha)\operatorname{ctg}(-\alpha)+1]+\operatorname{tg}\alpha+\operatorname{tg}(-\alpha)+\operatorname{tg}(\pi+\alpha)$. [0]

207. $\operatorname{sen}(2\pi-\alpha)[\cos(-\alpha)\operatorname{ctg}(2\pi-\alpha)+\operatorname{sen}(2\pi-\alpha)]-\cos^2(-\alpha)-\operatorname{sen}^2(-\alpha)$. [0]

208. $[\operatorname{sen}(2\pi-\alpha)+1][\operatorname{tg}\alpha-\operatorname{ctg}(-\alpha)]+\dfrac{\operatorname{cosec}(2\pi-\alpha)}{\cos(2\pi-\alpha)}+\sec\alpha$. [0]

209. $\dfrac{\cos(-\alpha)}{1+\operatorname{sen}(-\alpha)}-\dfrac{1-\operatorname{sen}(360°-\alpha)}{\cos(-\alpha)}+\dfrac{\cos(-\alpha)}{\operatorname{sen}(-\alpha)}-\operatorname{ctg}(-\alpha)$. [0]

210. $\operatorname{sen}(-\alpha)\cos(-\alpha)\operatorname{tg}(-\alpha)\operatorname{ctg}(-\alpha)\sec(-\alpha)\operatorname{cosec}(-\alpha)$. [1]