

$$\begin{aligned}
 1. \quad & \sqrt{3} \operatorname{sen} \frac{\pi}{3} - \sqrt{3} \operatorname{tg} \frac{\pi}{3} - \operatorname{sen} \frac{\pi}{6} + \sec \frac{\pi}{6} \operatorname{sen} \frac{\pi}{3} + \sec \pi - 8 \cos \frac{\pi}{3} = \\
 & = \sqrt{3} \cdot \frac{\sqrt{3}}{2} - \sqrt{3} \cdot \sqrt{3} - \frac{1}{2} + \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{2} - 1 - 8 \cdot \frac{1}{2} = \frac{3}{2} - 3 - \frac{1}{2} + 1 - 1 - 4 = \mathbf{-6}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & \sqrt{3} a \sec \frac{\pi}{6} - \frac{b}{2} \operatorname{ctg} \frac{\pi}{4} + a \cos \pi - \sqrt{3} b \operatorname{sen} \frac{\pi}{3} + 2b = \\
 & = \sqrt{3} a \frac{2}{\sqrt{3}} - \frac{b}{2} \cdot 1 + a(-1) - \sqrt{3} b \frac{\sqrt{3}}{2} + 2b = 2a - \frac{b}{2} - a - \frac{3}{2}b + 2b = \mathbf{a}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & 2 \cos 300^\circ - \frac{3}{\sqrt{3}} \operatorname{tg} 210^\circ - \operatorname{sen} 405^\circ - \cos 780^\circ = \\
 & = 2 \frac{1}{2} - \frac{3}{\sqrt{3}} \frac{\sqrt{3}}{3} - \frac{\sqrt{2}}{2} - \frac{1}{2} = 1 - 1 - \frac{\sqrt{2}}{2} - \frac{1}{2} = \mathbf{-\frac{\sqrt{2}+1}{2}}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad & 4 \operatorname{sen} \frac{5}{6} \pi \cdot \cos \frac{7}{6} \pi - 2 \cos \frac{5}{6} \pi + 3 \operatorname{tg} \frac{3}{4} \pi + \operatorname{sen} \frac{7}{2} \pi = \\
 & = 4 \cdot \frac{1}{2} \cdot \left( -\frac{\sqrt{3}}{2} \right) - 2 \cdot \left( -\frac{\sqrt{3}}{2} \right) + 3(-1) + (-1) = -\sqrt{3} + \sqrt{3} - 3 - 1 = \mathbf{-4}
 \end{aligned}$$

$$\begin{aligned}
 5. \quad & 2 \operatorname{sen} \frac{7}{4} \pi \cdot \cos \frac{5}{4} \pi - \frac{3}{\sqrt{3}} \operatorname{ctg} \frac{11}{6} \pi + \operatorname{sen} \frac{7}{6} \pi + \frac{\sqrt{2}}{2} \cos \frac{9}{4} \pi = \\
 & = 2 \left( -\frac{\sqrt{2}}{2} \right) \cdot \left( -\frac{\sqrt{2}}{2} \right) - \frac{3}{\sqrt{3}} (-\sqrt{3}) - \frac{1}{2} + \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2} = 1 + 3 - \frac{1}{2} + \frac{1}{2} = \mathbf{4}
 \end{aligned}$$

$$6. \frac{\cos \frac{4}{3} \pi \left( \operatorname{tg} \frac{5}{4} \pi - \operatorname{ctg} \frac{7}{6} \pi \right)}{-\operatorname{sen} \frac{4}{3} \pi + \cos \frac{11}{6} \pi} = \frac{1}{2} \operatorname{ctg} \frac{2}{3} \pi + \frac{1}{2}$$

$$\frac{-\frac{1}{2} (1 - \sqrt{3})}{\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2}} = \frac{1}{2} \left( -\frac{\sqrt{3}}{3} \right) + \frac{1}{2}$$

$$\frac{-\frac{1}{2} + \frac{\sqrt{3}}{2}}{\sqrt{3}} = -\frac{\sqrt{3}}{6} + \frac{1}{2}$$

$$\left( -\frac{1}{2} + \frac{\sqrt{3}}{2} \right) \frac{\sqrt{3}}{3} = -\frac{\sqrt{3}}{6} + \frac{1}{2}$$

$$-\frac{\sqrt{3}}{6} + \frac{1}{2} = -\frac{\sqrt{3}}{6} + \frac{1}{2}$$

$$7. \operatorname{sen} (-\alpha) + \operatorname{sen} \left( \frac{\pi}{2} - \alpha \right) + \cos (\pi + \alpha) - \cos (\pi - \alpha) =$$

$$= -\operatorname{sen} \alpha + \cos \alpha - \cos \alpha + \cos \alpha = \cos \alpha - \operatorname{sen} \alpha$$

$$8. \frac{(a^2 - b^2) \operatorname{ctg} (\pi - \alpha)}{\operatorname{tg} \left( \frac{\pi}{2} - \alpha \right)} - \frac{(a^2 + b^2) \operatorname{tg} \left( \frac{\pi}{2} - \alpha \right)}{\operatorname{ctg} (2\pi - \alpha)} =$$

$$= \frac{(a^2 - b^2) (-\operatorname{ctg} \alpha)}{\operatorname{ctg} \alpha} - \frac{(a^2 + b^2) \operatorname{ctg} \alpha}{-\operatorname{ctg} \alpha} = -a^2 + b^2 + a^2 + b^2 = 2b^2$$

$$9. \frac{\cos (4\pi - \alpha)}{\operatorname{sen} \left( \frac{\pi}{2} + \alpha \right)} \cdot \frac{1}{\cos \left( \frac{3}{2} \pi - \alpha \right) \cdot \cos \left( \alpha + \frac{\pi}{2} \right)} + \frac{\operatorname{tg} \left( \alpha + \frac{3}{2} \pi \right) \cdot \operatorname{ctg} (2\pi - \alpha)}{\cos (\pi - \alpha) \cdot \operatorname{sen} \left( \frac{3}{2} \pi - \alpha \right)} =$$

$$= \frac{\cos \alpha}{\cos \alpha} \cdot \frac{1}{-\operatorname{sen} \alpha \cdot (-\operatorname{sen} \alpha)} + \frac{-\operatorname{ctg} \alpha \cdot (-\operatorname{ctg} \alpha)}{-\cos \alpha \cdot (-\cos \alpha)} =$$

$$= \frac{1}{\operatorname{sen}^2 \alpha} + \frac{\operatorname{ctg}^2 \alpha}{\cos^2 \alpha} = \frac{1}{\operatorname{sen}^2 \alpha} + \frac{\cos^2 \alpha}{\operatorname{sen}^2 \alpha} \cdot \frac{1}{\cos^2 \alpha} = \frac{2}{\operatorname{sen}^2 \alpha}$$

$$\begin{aligned}
 10. \quad & \frac{\operatorname{tg} \left( \frac{3}{2} \pi - \alpha \right) \frac{\cos \left( \frac{\pi}{2} - \alpha \right)}{\cos (\alpha - 8\pi)}}{[\cos (\pi - \alpha) \cos (-3\pi - \alpha) - \cos^2 (\alpha - \pi) \cos \pi] + 2 \operatorname{sen} (\alpha - \pi) \cos \left( \frac{3}{2} \pi - \alpha \right)} = \\
 & = \frac{\operatorname{ctg} \alpha \frac{\operatorname{sen} \alpha}{\cos \alpha}}{-\cos \alpha (-\cos \alpha) - \cos^2 \alpha (-1) + 2 (-\operatorname{sen} \alpha) (-\operatorname{sen} \alpha)} = \\
 & = \frac{\frac{\cos \alpha}{\operatorname{sen} \alpha} \cdot \frac{\operatorname{sen} \alpha}{\cos \alpha}}{\cos^2 \alpha + \cos^2 \alpha + 2 \operatorname{sen}^2 \alpha} = \frac{1}{2 (\cos^2 \alpha + \operatorname{sen}^2 \alpha)} = \frac{1}{2}
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & \frac{\operatorname{sen} (450^\circ + \alpha) \cos (\alpha - 270^\circ) \cos (720^\circ - \alpha)}{\operatorname{tg} (\alpha + 180^\circ) \cos (540^\circ - \alpha)} + \operatorname{sen}^2 (180^\circ - \alpha) = \\
 & = \frac{\cos \alpha (-\operatorname{sen} \alpha) \cos \alpha}{\operatorname{tg} \alpha (-\cos \alpha)} + \operatorname{sen}^2 \alpha = \frac{\cos \alpha \operatorname{sen} \alpha}{\operatorname{tg} \alpha} + \operatorname{sen}^2 \alpha = \\
 & = \cos \alpha \operatorname{sen} \alpha \cdot \frac{\cos \alpha}{\operatorname{sen} \alpha} + \operatorname{sen}^2 \alpha = \cos^2 \alpha + \operatorname{sen}^2 \alpha = 1
 \end{aligned}$$