

Упростить выражения

$$I.85. \left(1 + \sin \frac{x}{2}\right) \left(1 - \sin \frac{x}{2}\right),$$

$$I.86. \left(\frac{1}{\cos \alpha} + \operatorname{tg} \alpha\right) \left(\frac{1}{\cos \alpha} - \operatorname{tg} \alpha\right),$$

$$I.87. \frac{1}{\cos^2 \alpha} - \operatorname{tg}^2 \alpha (\cos^2 \alpha + 1),$$

$$I.88. (1 + \sin^2 \beta) \operatorname{ctg}^2 \beta - \frac{1}{\sin^2 \beta},$$

$$I.89. \frac{\cos^2 \frac{\pi \alpha}{2}}{\sin \frac{\pi \alpha}{2} - 1},$$

$$I.90. (\sin \alpha + \cos \alpha)^2 + (\sin \alpha - \cos \alpha)^2,$$

$$I.91. (\operatorname{tg} \beta + \operatorname{ctg} \beta)^2 - (\operatorname{tg} \beta - \operatorname{ctg} \beta)^2,$$

$$I.92. (1 + \operatorname{tg} \alpha)^2 + (1 - \operatorname{tg} \alpha)^2,$$

$$I.93. (1 + \operatorname{ctg} \beta)^2 + (1 - \operatorname{ctg} \beta)^2,$$

$$I.94. \sin^4 \alpha + 2 \sin^2 \alpha \cos^2 \alpha + \cos^4 \alpha.$$

$$I.103. \sin^2 \alpha \cos^2 \alpha (\operatorname{tg}^2 \alpha + \operatorname{ctg}^2 \alpha + 2),$$

$$I.104. \frac{\sin \alpha}{1 + \cos \alpha} + \frac{\sin \alpha}{1 - \cos \alpha},$$

$$I.105. \frac{\cos \beta}{1 + \sin \beta} + \frac{\cos \beta}{1 - \sin \beta},$$

$$I.106. \operatorname{ctg} x + \frac{\sin x}{1 + \cos x},$$

$$I.107. \operatorname{tg} x + \frac{\cos x}{1 + \sin x},$$

$$I.108. \frac{1 - \sin x}{\cos x} - \frac{\cos x}{1 + \sin x},$$

$$I.109. \frac{\sin \varphi}{1 - \cos \varphi} - \frac{1 + \cos \varphi}{\sin \varphi},$$

$$I.110. \frac{\sin \alpha}{1 + \cos \alpha} + \frac{1 + \cos \alpha}{\sin \alpha},$$

$$I.118. \cos^4 \alpha - \cos^2 \alpha + \sin^2 \alpha,$$

$$I.119. \sin^4 \alpha + \sin^2 \alpha \cos^2 \alpha + \cos^2 \alpha,$$

$$I.120. \sin^2 \alpha + \sin^2 \alpha \cos^2 \alpha + \cos^4 \alpha,$$

$$I.121. \sin^4 \alpha - \cos^4 \alpha + \cos^2 \alpha,$$

$$I.122. \cos^4 \alpha + \sin^2 \alpha \cos^2 \alpha - \cos^2 \alpha - 1.$$

Доказать тождества

$$I.141. \sin^6 \alpha + \cos^6 \alpha + 3 \sin^2 \alpha \cos^2 \alpha = 1.$$

$$I.142. 2 (\sin^6 \alpha + \cos^6 \alpha) - 3 (\sin^4 \alpha + \cos^4 \alpha) = -1.$$

$$I.143. \frac{1 - \cos^4 \beta - \sin^4 \beta}{\operatorname{tg}^2 \beta} = 2 \cos^4 \beta.$$

$$I.152. \operatorname{tg}^4 \alpha + \operatorname{tg}^2 \alpha = \frac{\sin^2 \alpha}{\cos^4 \alpha}.$$

$$I.153. 1 + \sin \alpha + \cos \alpha + \operatorname{ctg} \alpha = (1 + \sin \alpha)(1 + \operatorname{ctg} \alpha).$$

$$I.154. \frac{\sin \alpha + \operatorname{tg} \alpha}{1 + \cos \alpha} = \operatorname{tg} \alpha.$$

$$I.155. 1 + \frac{\cos \alpha \operatorname{tg}^2 \alpha}{1 + \cos \alpha} = \frac{1}{\cos \alpha}.$$

$$I.156. 1 + (\operatorname{ctg}^2 \alpha - \operatorname{tg}^2 \alpha) \cos^2 \alpha = \operatorname{ctg}^2 \alpha.$$

$$I.157. \frac{(\sin \alpha + \cos \alpha)^2 - 1}{\operatorname{tg} \alpha - \sin \alpha \cos \alpha} = 2 \operatorname{ctg}^2 \alpha.$$