

# Преобразование тригонометрических выражений

## Сложность «1»

В задачах 8.091—8.100 вычислить:

$$8.091. \frac{5\left(\cos\left(\frac{\pi}{2} - \frac{3\pi}{14}\right) - \sin\frac{\pi}{14}\right)}{\cos\frac{\pi}{7} \sin\frac{\pi}{14}}$$

$$8.092. \frac{3\left(\cos\frac{\pi}{5} + \sin\left(\frac{\pi}{2} - 2\frac{\pi}{5}\right)\right)}{2\cos\frac{3\pi}{10} \cos\frac{\pi}{10}}$$

$$8.093. \frac{\sin\frac{2\pi}{7} + \sin\frac{4\pi}{9}}{5\sin\left(\frac{\pi}{7} + \frac{2\pi}{9}\right)\cos\left(\frac{\pi}{7} - \frac{2\pi}{9}\right)}$$

$$8.094. \frac{\cos\frac{2\pi}{5} - \cos\frac{\pi}{5}}{2\sin\frac{3\pi}{10} \sin\frac{\pi}{10}}$$

$$8.095. \frac{\cos\frac{3\pi}{8} + \sin\frac{3\pi}{8}}{\sin\frac{\pi}{4} \cos\frac{\pi}{8}}$$

$$8.096. \frac{\sin\frac{\pi}{12} + \sin\frac{\pi}{4}}{4\sin\frac{\pi}{6} \cos\frac{\pi}{12}}$$

$$8.097. \frac{\sin\frac{2\pi}{11} + \cos\left(\frac{\pi}{2} - \frac{4\pi}{7}\right)}{10\sin\left(\frac{\pi}{11} + \frac{2\pi}{7}\right)\sin\left(\frac{\pi}{2} - \frac{\pi}{11} + \frac{2\pi}{7}\right)}$$

$$8.098. \frac{\sin\frac{\pi}{9} - \sin\frac{\pi}{3}}{4\cos\frac{2\pi}{9} \sin\frac{\pi}{9}}$$

$$8.099. \frac{\cos\frac{2\pi}{13} - \sin\left(\frac{\pi}{2} - \frac{\pi}{13}\right)}{\sin\frac{\pi}{26} \sin\frac{3\pi}{26}}$$

$$8.100. \frac{\cos\frac{\pi}{12} + \cos\frac{\pi}{6}}{\cos\frac{\pi}{8} \cos\frac{\pi}{24}}$$

## Сложность «1»

В задачах 8.101—8.110 вычислить:

$$8.101. \frac{\sin^2 32^\circ + \sin 26^\circ}{5\cos^2 32^\circ}$$

$$8.102. \operatorname{tg} 7^\circ \left( \frac{1}{\sin 14^\circ} + \frac{1}{\operatorname{tg} 14^\circ} \right)$$

$$8.103. \frac{\cos^2 34^\circ - \sin 22^\circ}{4\sin^2 34^\circ}$$

$$8.104. \frac{\sin 10^\circ (1 + \operatorname{tg}^2 5^\circ)}{\operatorname{tg} 5^\circ}$$

$$8.105. \frac{1 - \sin 84^\circ}{\cos^2 87^\circ}$$

$$8.106. \frac{\cos 2^\circ (1 + \operatorname{tg}^2 1^\circ)}{2(1 - \operatorname{tg}^2 1^\circ)}$$

$$8.107. \frac{1 - \sin^2 38^\circ}{2(\sin 14^\circ + \sin^2 38^\circ)}$$

$$8.108. \frac{\operatorname{tg} 34^\circ (1 - \operatorname{tg}^2 17^\circ)}{4\operatorname{tg} 17^\circ}$$

$$8.109. \frac{1 + \cos 62^\circ - \cos^2 31^\circ}{\cos^2 31^\circ} - 1$$

$$8.110. \frac{1 + \sin 18^\circ - \cos^2 36^\circ}{2\cos^2 36^\circ} + \frac{1}{4}$$

## Сложность «1»

В задачах 8.111—8.120 вычислить:

$$8.111. \frac{\cos 9^\circ + \cos 51^\circ + \sqrt{3} \cos 21^\circ}{2\sqrt{3} \cos 21^\circ}$$

$$8.112. \frac{\cos 48^\circ + \cos 42^\circ + \sqrt{2} \cos 3^\circ}{\sqrt{2} \sin 87^\circ}$$

$$8.113. \frac{\cos 73^\circ + \cos 47^\circ + 2 \cos 13^\circ}{2 \cos 13^\circ}$$

$$8.114. \frac{\cos 85^\circ - \cos 35^\circ - \sqrt{3} \cos 65^\circ}{\sqrt{3} \sin 25^\circ}$$

$$8.115. \frac{3(1 + \cos 10^\circ + \cos 110^\circ)}{1 - \cos 130^\circ}$$

$$8.116. \frac{\cos 43^\circ + \cos 77^\circ + 1}{4 \cos^2(8^\circ 30')}$$

$$8.117. \frac{\cos 31^\circ + \cos 89^\circ + 1}{-\cos^2(14^\circ 30')}$$

$$8.118. \frac{\cos 85^\circ + \cos 35^\circ - 2 \sin 65^\circ}{\cos 25^\circ}$$

$$8.119. \frac{2 \cos^2 42^\circ + \cos 36^\circ}{\cos^2 168^\circ}$$

$$8.120. \frac{\cos 68^\circ - 2 \cos^2 4^\circ}{2 \cos^2 26^\circ}$$

*Сложность «1»*

В задачах 8.121—8.130 вычислить:

$$8.121. \frac{2 \cos^2 16^\circ + 2 \cos^2 76^\circ - 3}{\cos^2 44^\circ}$$

$$8.122. \cos^2 23^\circ + \cos^2 83^\circ + \cos^2 37^\circ + 3$$

$$8.123. \frac{2 \sin^2 85^\circ + 2 \sin^2 25^\circ - 3}{4 \cos^2 55^\circ}$$

$$8.124. \cos^2 86^\circ + \cos^2 34^\circ - \cos^2 64^\circ + 3$$

$$8.125. \frac{3 - 2 \cos^2 17^\circ - 2 \sin^2 13^\circ}{2 \cos^2 43^\circ}$$

$$8.126. \sin^2 35^\circ + \sin^2 155^\circ + \sin^2 85^\circ - 3$$

$$8.127. \frac{-3 + 2 \sin^2 78^\circ + 2 \sin^2 18^\circ}{5 \sin^2 42^\circ}$$

$$8.128. \cos^2 23^\circ - \cos^2 7^\circ + \sin^2 53^\circ - 3$$

$$8.129. \frac{2 \cos^2 46^\circ + 2 \cos^2 106^\circ - 3}{\sin^2 76^\circ}$$

$$8.130. \cos^2 19^\circ + \sin^2 11^\circ + \cos^2 41^\circ + 2$$

*Сложность «1»*

В задачах 8.131—8.140 вычислить:

$$8.131. \frac{3 \cos 196^\circ + 12 \cos 164^\circ}{\cos 16^\circ}$$

$$8.132. \frac{2 \cos 201^\circ - 16 \sin 111^\circ}{\cos 21^\circ}$$

$$8.133. \frac{7 \sin 258^\circ + 13 \sin 102^\circ}{\sin 78^\circ}$$

$$8.134. \frac{5 \sin 118^\circ + 9 \cos 28^\circ}{\sin 62^\circ}$$

$$8.135. \frac{14 \sin 143^\circ - 5 \cos 127^\circ}{\sin 37^\circ}$$

$$8.136. \frac{12 \cos 276^\circ + 7 \sin 186^\circ}{\sin 6^\circ}$$

$$8.137. \frac{11 \sin 112^\circ - 3 \cos 338^\circ}{\cos 22^\circ}$$

$$8.138. \frac{2 \cos 257^\circ + 17 \cos 103^\circ}{\sin 13^\circ}$$

$$8.139. \frac{16 \sin 251^\circ - 10 \cos 161^\circ}{\cos 19^\circ}$$

$$8.140. \frac{8 \sin 194^\circ + \cos 256^\circ}{\sin 14^\circ}$$

*Сложность «1»*

В задачах 8.141—8.150 вычислить:

$$8.141. \frac{\sin 43^\circ + \sin 17^\circ}{2 \cos 13^\circ + 3 \sin 77^\circ}$$

$$8.142. \frac{3 \cos 9^\circ + \sin 81^\circ}{\sin 21^\circ + \sin 39^\circ}$$

$$8.143. \frac{\cos 71^\circ + \cos 49^\circ}{7 \cos 11^\circ - 3 \sin 79^\circ}$$

$$8.144. \frac{\cos 49^\circ + 2 \sin 41^\circ}{\sin 79^\circ - \sin 19^\circ}$$

$$8.145. \frac{\cos 13^\circ - \cos 47^\circ}{12 \sin 17^\circ - 2 \cos 73^\circ}$$

$$8.146. \frac{4 \cos 6^\circ + 3 \sin 84^\circ}{\cos 66^\circ + \cos 54^\circ}$$

$$8.147. \frac{\sin 44^\circ + \cos 74^\circ}{2 \cos 14^\circ + 2 \sin 104^\circ}$$

$$8.148. \frac{2\sqrt{2} \cos 7^\circ + \sqrt{2} \sin 83^\circ}{\cos 52^\circ + \cos 38^\circ}$$

$$8.149. \frac{\sin 91^\circ - \sin 1^\circ}{9\sqrt{2} \cos 46^\circ + \sqrt{2} \sin 44^\circ}$$

$$8.150. \frac{2\sqrt{2} \sin 22^\circ + 5\sqrt{2} \cos 68^\circ}{\cos 23^\circ - \cos 67^\circ}$$

*Сложность «2»*

В задачах 8.151—8.160 вычислить:

$$8.151. \frac{\cos 6^\circ + \cos 12^\circ + \cos 36^\circ + \cos 42^\circ}{\sin 87^\circ \cos 15^\circ \cos 24^\circ}$$

$$8.152. \frac{\sin 36^\circ + \sin 40^\circ + \sin 44^\circ + \sin 48^\circ}{2 \sin 88^\circ \cos 4^\circ \sin 42^\circ}$$

$$8.153. \frac{\cos 16^\circ - \cos 24^\circ - \cos 32^\circ + \cos 40^\circ}{\cos 86^\circ \sin 8^\circ \cos 28^\circ}$$

$$8.154. \frac{\sin 48^\circ - \sin 60^\circ - \sin 72^\circ + \sin 84^\circ}{4 \cos 84^\circ \sin 12^\circ \sin 66^\circ}$$

$$8.155. \frac{\cos 14^\circ + \sin 14^\circ + \cos 42^\circ + \sin 42^\circ}{\sqrt{2} \cos 14^\circ \sin 73^\circ}$$

$$8.156. - \frac{\cos 8^\circ + \cos 16^\circ + \sin 42^\circ + \sin 34^\circ}{4 \cos 4^\circ \cos 20^\circ \sin 58^\circ}$$

$$8.157. \frac{\sin 36^\circ + \sin 40^\circ + \cos 62^\circ + \cos 42^\circ}{4 \cos 6^\circ \cos 4^\circ \sin 38^\circ}$$

$$8.158. \frac{\cos 4^\circ - \cos 6^\circ - \cos 8^\circ + \cos 10^\circ}{\sin^2 1^\circ \cos 1^\circ \cos 7^\circ}$$