

# Сборник заданий С1

| №  | а) Решите уравнение. б) Найдите все корни этого уравнения, принадлежащие промежутку. | Ответ                                                                                                                                                                        |
|----|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | $\cos 2x - \sin^2\left(\frac{\pi}{2} - x\right) = -0,25$                             | $\left[\pi; \frac{5\pi}{2}\right]$<br>а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{7\pi}{6}; \frac{11\pi}{6}; \frac{13\pi}{6}$                               |
| 2  | $\cos 2x + 3\sin^2 x = 1,25$                                                         | $\left[\pi; \frac{5\pi}{2}\right]$<br>а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{7\pi}{6}; \frac{11\pi}{6}; \frac{13\pi}{6}$                               |
| 3  | $2\sin^2\left(\frac{3\pi}{2} + x\right) = \sqrt{3}\cos x$                            | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\frac{\pi}{2} + \pi k; \pm \frac{\pi}{6} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{7\pi}{2}; -\frac{5\pi}{2}; -\frac{13\pi}{6}$  |
| 4  | $\sqrt{2}\sin^2\left(\frac{\pi}{2} + x\right) = -\cos x$                             | $\left[-\frac{5\pi}{2}; -\pi\right]$<br>а) $\frac{\pi}{2} + \pi k; \pm \frac{3\pi}{4} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{5\pi}{2}; -\frac{3\pi}{2}; -\frac{5\pi}{4}$   |
| 5  | $\sqrt{3}\sin 2x + 3\cos 2x = 0$                                                     | $\left[\frac{3\pi}{2}; 3\pi\right]$<br>а) $-\frac{\pi}{6} + \frac{\pi k}{2}, k \in \mathbb{Z}$ ; б) $\frac{11\pi}{6}; \frac{7\pi}{3}; \frac{17\pi}{6}$                       |
| 6  | $\sin x + \sin^2 \frac{x}{2} = \cos^2 \frac{x}{2}$                                   | $\left[-2\pi; -\frac{\pi}{2}\right]$<br>а) $\frac{\pi}{4} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{7\pi}{4}; -\frac{3\pi}{4}$                                                 |
| 7  | $7\tg^2 x - \frac{1}{\cos x} + 1 = 0$                                                | $\left[-\frac{5\pi}{2}; -\pi\right]$<br>а) $2\pi k, k \in \mathbb{Z}$ ; б) $-2\pi$                                                                                           |
| 8  | $4\tg^2 x + \frac{3}{\cos^2 x} + 3 = 0$                                              | $\left[\frac{5\pi}{2}; 4\pi\right]$<br>а) $\pi + \pi k, k \in \mathbb{Z}$ ; б) $3\pi$                                                                                        |
| 9  | $\cos 2x = \sin\left(\frac{3\pi}{2} - x\right)$                                      | $\left[\frac{3\pi}{2}; \frac{5\pi}{2}\right]$<br>а) $-\pi + 2\pi k, \pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $\frac{5\pi}{3}; \frac{7\pi}{3}$                      |
| 10 | $\cos 2x = \sin\left(x + \frac{\pi}{2}\right)$                                       | $[-2\pi; -\pi]$<br>а) $2\pi k, \pm \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-2\pi; -\frac{4\pi}{3}$                                                                  |
| 11 | $2\sin^2\left(\frac{3\pi}{2} - x\right) = \cos x$                                    | $\left[-\frac{3\pi}{2}; 0\right]$<br>а) $\frac{\pi}{2} + \pi k, \pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{3\pi}{2}; -\frac{\pi}{2}; -\frac{\pi}{3}$         |
| 12 | $2\sin^2\left(\frac{\pi}{2} - x\right) = -\sqrt{3}\cos x$                            | $\left[-3\pi; -\frac{3\pi}{2}\right]$<br>а) $\frac{\pi}{2} + \pi k, \pm \frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{17\pi}{6}; -\frac{5\pi}{2}; -\frac{3\pi}{2}$ |
| 13 | $-\sqrt{2}\sin\left(-\frac{5\pi}{2} + x\right) \cdot \sin x = \cos x$                | $\left[\frac{9\pi}{2}; 6\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z}$ ; б) $\frac{9\pi}{2}; \frac{11\pi}{2}; \frac{19\pi}{4}$ |
| 14 | $9^{x+1} - 2 \cdot 3^{x+2} + 5 = 0$                                                  | $\left(\log_3 \frac{3}{2}; \sqrt{5}\right)$<br>а) $-1; \log_3 \frac{5}{3}$ ; б) $\log_3 \frac{5}{3}$                                                                         |
| 15 | $\sin x = \cos\left(\frac{\pi}{2} - 2x\right)$                                       | $\left(-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\pi k, \pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-2\pi; -3\pi; -\frac{7\pi}{3}$                                       |
| 16 | $2\cos^2 x + \cos x - 1 = 0$                                                         | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\pi + 2\pi k, \pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-3\pi; -\frac{7\pi}{3}$                                       |
| 17 | $2\sin^2 x + \sin x - 1 = 0$                                                         | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $-\frac{\pi}{2} + 2\pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z}$ ; б) $-\frac{5\pi}{2}; -\frac{19\pi}{6}$            |
| 18 | $\cos 2x - 0,75 + \sin^2 x = 0$                                                      | $\left[\frac{3\pi}{2}; 3\pi\right]$<br>а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{11\pi}{6}; \frac{13\pi}{6}; \frac{17\pi}{6}$                             |
| 19 | $1 + \cos\left(\frac{\pi}{2} + x\right) = \cos 2x$                                   | $\left[-3\pi; -\frac{3\pi}{2}\right]$<br>а) $\pi k, (-1)^k \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $-2\pi; -3\pi; -\frac{11\pi}{6}$                                    |
| 20 | $\cos^2 x - 0,75 = \cos 2x$                                                          | $\left[-\frac{9\pi}{2}; -3\pi\right]$<br>а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{10\pi}{3}; -\frac{11\pi}{3}; -\frac{13\pi}{3}$                        |
| 21 | $\cos\left(\frac{\pi}{2} + 2x\right) = \sin x$                                       | $\left[\pi; \frac{5\pi}{2}\right)$<br>а) $\pi k, \pm \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $\pi; 2\pi; \frac{4\pi}{3}$                                             |

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| 22 | $\cos 2x - 0,5 + \sin^2 x = 0$                                                       | $\left[ \pi; \frac{5\pi}{2} \right]$<br>а) $\pm \frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $\frac{5\pi}{4}; \frac{7\pi}{4}; \frac{9\pi}{4}$                                                 |
| 23 | $\cos 2x + 0,5 = \cos^2 x$                                                           | $\left[ -2\pi; -\frac{\pi}{2} \right]$<br>а) $\pm \frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $-\frac{3\pi}{4}; -\frac{5\pi}{4}; -\frac{7\pi}{4}$                                            |
| 24 | $2\sin^2 x - 3\sin x + 1 = 0$                                                        | $\left( 3\pi; \frac{9\pi}{2} \right]$<br>а) $\frac{\pi}{2} + 2\pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{9\pi}{2}; \frac{25\pi}{6}$                                 |
| 25 | $\sqrt{\cos^2 x + 15,25 - \cos 2x} = 4$                                              | $\left[ -\frac{9\pi}{2}; -3\pi \right]$<br>а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z};$ б) $-\frac{10\pi}{3}; -\frac{11\pi}{3}; -\frac{13\pi}{3}$                                        |
| 26 | $9^{\cos^2 x} = 3^{\sin 2x} \cdot 9$                                                 | $\left( -2\pi; -\frac{\pi}{2} \right)$<br>а) $\pi n, -\frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $-\frac{5\pi}{4}; -\pi$                                                                 |
| 27 | $4^{\sin^2 x} = \left( \frac{1}{2} \right)^{\sin 2x} \cdot 4$                        | $\left( 2\pi; \frac{7\pi}{2} \right)$<br>а) $\frac{\pi}{2} + \pi n; \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{2}; \frac{9\pi}{4}; \frac{13\pi}{4}$                         |
| 28 | $\log_{\frac{1}{3}}(\sqrt{2} \cos x - \sin 2x + 27) = -3$                            | $\left[ -\pi; \frac{\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $\pm \frac{\pi}{2}; \frac{\pi}{4}$                                  |
| 29 | $\log_5(\cos x - \sin 2x + 25) = 2$                                                  | $\left[ 2\pi; \frac{7\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{2}; \frac{7\pi}{2}; \frac{13\pi}{6}; \frac{17\pi}{6}$ |
| 30 | $16^{\cos^2 x} = \left( \frac{1}{4} \right)^{\sin 2x} \cdot 16$                      | $\left( -\frac{3\pi}{2}; 0 \right)$<br>а) $\pi k, \frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $-\pi; -\frac{3\pi}{4}$                                                                        |
| 31 | $25^{\sin^2 x} = 5^{\sin 2x} \cdot 25$                                               | $\left( -\pi; \frac{\pi}{2} \right)$<br>а) $\frac{\pi}{2} + \pi n; -\frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $-\frac{\pi}{2}; -\frac{\pi}{4}$                                          |
| 32 | $\sqrt{8,5 + \sin^2 x + \cos 2x} = 3$                                                | $\left[ \pi; \frac{5\pi}{2} \right]$<br>а) $\pm \frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $\frac{5\pi}{4}; \frac{7\pi}{4}; \frac{9\pi}{4}$                                                 |
| 33 | $\sqrt{\cos^2 x + 24,75 - \cos 2x} = 5$                                              | $\left[ -\frac{7\pi}{2}; -2\pi \right]$<br>а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z};$ б) $-\frac{19\pi}{6}; -\frac{17\pi}{6}; -\frac{13\pi}{6}$                                        |
| 34 | $\left( \frac{1}{36} \right)^{\cos^2 x} = 6^{\sin 2x} \cdot \frac{1}{36}$            | $\left( \pi; \frac{5\pi}{2} \right)$<br>а) $\pi k, \frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $2\pi; \frac{5\pi}{4}; \frac{9\pi}{4}$                                                        |
| 35 | $\sqrt{3} \sin 2x + \cos 2x + 1 = 0$                                                 | $\left[ -\frac{5\pi}{2}; -\pi \right]$<br>а) $\frac{\pi}{2} + \pi k; -\frac{\pi}{6} + \pi k, k \in \mathbb{Z};$<br>б) $-\frac{5\pi}{2}; -\frac{13\pi}{6}; -\frac{3\pi}{2}; -\frac{7\pi}{6}$   |
| 36 | $\sqrt{3} \sin 2x + 3 \cos 2x = 3$                                                   | $\left[ \frac{3\pi}{2}; 3\pi \right]$<br>а) $\pi k; \frac{\pi}{6} + \pi k, k \in \mathbb{Z};$ б) $2\pi; \frac{13\pi}{6}; 3\pi$                                                                |
| 37 | $\cos\left(\frac{3\pi}{2} + 2x\right) = \sqrt{3} \cos x$                             | $[-4\pi; -3\pi]$<br>а) $\frac{\pi}{3} + 2\pi k; \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{11\pi}{3}; -\frac{7\pi}{2}; -\frac{10\pi}{3}$                                          |
| 38 | $\cos\left(\frac{3\pi}{2} - 2x\right) = \sqrt{3} \sin x$                             | $[-3\pi; -2\pi]$<br>а) $\pm \frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z};$ б) $-3\pi; -\frac{17\pi}{6}; -2\pi$                                                                                   |
| 39 | $\cos\left(\frac{\pi}{2} - 2x\right) = \sqrt{2} \cos x$                              | $[-6\pi; -5\pi]$<br>а) $\frac{\pi}{4} + 2\pi k; \frac{3\pi}{4} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{23\pi}{4}; -\frac{11\pi}{2}; -\frac{21\pi}{4}$                                         |
| 40 | $\cos\left(\frac{\pi}{2} + 2x\right) = \sqrt{2} \sin x$                              | $[-5\pi; -4\pi]$<br>а) $\pm \frac{3\pi}{4} + 2\pi k, k \in \mathbb{Z};$ б) $-5\pi; -\frac{19\pi}{4}; -4\pi$                                                                                   |
| 41 | $3\sin 2x - 4\cos x + 3\sin x - 2 = 0$                                               | $\left[ -\frac{\pi}{2}; \frac{\pi}{2} \right]$<br>а) $\pm \frac{2\pi}{3} + 2\pi n; (-1)^k \arcsin \frac{2}{3} + \pi k; n, k \in \mathbb{Z};$ б) $\arcsin \frac{2}{3}$                         |
| 42 | $(\sqrt{3} \cos^2 x + 2 \cos x) \sqrt{1 - 2 \sin x} = 0$                             | $\left[ \frac{\pi}{2}; \frac{5\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{6}; \frac{3\pi}{2}; \frac{13\pi}{6}$         |

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|----|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 43 | $2 \sin 2x = 4 \cos x - \sin x + 1$                                                  | $\left[ \frac{\pi}{2}, \frac{3\pi}{2} \right]$<br>а) $\frac{\pi}{2} + 2\pi n; \pm \left( \pi - \arccos \frac{1}{4} \right) + 2\pi k; n, k \in \mathbb{Z};$<br>б) $\frac{\pi}{2}; \pi - \arccos \frac{1}{4}; \pi + \arccos \frac{1}{4}$ |
| 44 | $\sin x(2 \sin x - 3 \operatorname{ctg} x) = 3$                                      | $\left[ -\frac{3\pi}{2}, \frac{\pi}{2} \right]$<br>а) $\pm \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{4\pi}{3}; -\frac{2\pi}{3}$                                                                                           |
| 45 | $\cos x(2 \cos x + \operatorname{tg} x) = 1$                                         | $\left[ -\frac{5\pi}{2}, -\frac{\pi}{2} \right]$<br>а) $-\frac{\pi}{6} + 2\pi k, \frac{7\pi}{6} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{13\pi}{6}; -\frac{5\pi}{6}$                                                                    |
| 46 | $\sqrt{2} \sin^3 x - \sqrt{2} \sin x + \cos^2 x = 0$                                 | $\left[ -\frac{5\pi}{2}, -\pi \right]$<br>а) $\frac{\pi}{2} + \pi m; \frac{\pi}{4} + 2\pi k, \frac{3\pi}{4} + 2\pi k; m, k \in \mathbb{Z};$<br>б) $-\frac{5\pi}{2}; -\frac{7\pi}{4}; -\frac{3\pi}{2}; -\frac{5\pi}{4}$                 |
| 47 | $6 \cos^2 x - 7 \cos \left( \frac{3\pi}{2} - x \right) - 1 = 0$                      | $\left[ 2\pi, \frac{7\pi}{2} \right]$<br>а) $(-1)^k \frac{\pi}{6} + \pi k; k \in \mathbb{Z};$ б) $\frac{19\pi}{6}$                                                                                                                     |
| 48 | $12^{\sin x} = 4^{\sin x} \cdot 3^{-\sqrt{3} \cos x}$                                | $\left[ \frac{5\pi}{2}, 4\pi \right]$<br>а) $-\frac{\pi}{3} + \pi n, n \in \mathbb{Z};$ б) $\frac{8\pi}{3}; \frac{11\pi}{3}$                                                                                                           |
| 49 | $12^{\sin x} = 3^{\sin x} \cdot 4^{\cos x}$                                          | $\left[ 2\pi, \frac{7\pi}{2} \right]$<br>а) $\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $\frac{9\pi}{4}; \frac{13\pi}{4}$                                                                                                            |
| 50 | $10^{\sin x} = 2^{\sin x} \cdot 5^{-\cos x}$                                         | $\left[ -\frac{5\pi}{2}, -\pi \right]$<br>а) $-\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $-\frac{9\pi}{4}; -\frac{5\pi}{4}$                                                                                                         |
| 51 | $14^{\cos x} = 2^{\cos x} \cdot 7^{-\sin x}$                                         | $\left[ \frac{\pi}{2}, 2\pi \right]$<br>а) $-\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $\frac{7\pi}{4}$                                                                                                                             |
| 52 | $15^{\cos x} = 3^{\cos x} \cdot 5^{\sin x}$                                          | $\left[ 5\pi, \frac{13\pi}{2} \right]$<br>а) $\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $\frac{21\pi}{4}; \frac{25\pi}{4}$                                                                                                          |
| 53 | $20^{\cos x} = 4^{\cos x} \cdot 5^{-\sin x}$                                         | $\left[ -\frac{9\pi}{2}, -3\pi \right]$<br>а) $-\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $-\frac{17\pi}{4}; -\frac{13\pi}{4}$                                                                                                      |
| 54 | $21^{-\sin x} = 3^{-\sin x} \cdot 7^{\cos x}$                                        | $\left[ -\frac{3\pi}{2}, 0 \right]$<br>а) $-\frac{\pi}{4} + \pi k, k \in \mathbb{Z};$ б) $-\frac{5\pi}{4}; -\frac{\pi}{4}$                                                                                                             |
| 55 | $(36^{\cos x})^{\sin x} = \left( \frac{1}{6} \right)^{\sqrt{2} \sin x}$              | $\left[ -\pi, \frac{\pi}{2} \right]$<br>а) $\pi n; \pm \frac{3\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $-\pi; -\frac{3\pi}{4}; 0$                                                                                                    |
| 56 | $(25^{\sin x})^{\cos x} = 5^{\sqrt{3} \sin x}$                                       | $\left[ \frac{5\pi}{2}, 4\pi \right]$<br>а) $\pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $\frac{17\pi}{6}; 3\pi; \frac{19\pi}{6}; 4\pi$                                                                               |
| 57 | $(25^{\sin x})^{-\cos x} = 5^{\sqrt{2} \sin x}$                                      | $\left[ \frac{3\pi}{2}, 3\pi \right]$<br>а) $\pi n; \pm \frac{3\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $2\pi; \frac{11\pi}{4}; 3\pi$                                                                                                |
| 58 | $(64^{\cos x})^{\sin x} = 8^{\sqrt{3} \cos x}$                                       | $\left[ \pi, \frac{5\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{3} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{3\pi}{2}; \frac{7\pi}{3}; \frac{5\pi}{2}$                                                             |
| 59 | $(49^{\cos x})^{\sin x} = 7^{\sqrt{2} \cos x}$                                       | $\left[ \frac{5\pi}{2}, 4\pi \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{2}; \frac{11\pi}{4}; \frac{7\pi}{2}$                                                           |
| 60 | $(16^{\sin x})^{\cos x} = \left( \frac{1}{4} \right)^{\sqrt{3} \sin x}$              | $\left[ 2\pi, \frac{7\pi}{2} \right]$<br>а) $\pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $2\pi; \frac{17\pi}{6}; 3\pi; \frac{19\pi}{6}$                                                                               |
| 61 | $(81^{\sin x})^{\cos x} = \left( \frac{1}{9} \right)^{\sqrt{2} \cos x}$              | $\left[ -3\pi, -\frac{3\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^{k+1} \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$<br>б) $-\frac{11\pi}{4}; -\frac{5\pi}{2}; -\frac{9\pi}{4}; -\frac{3\pi}{2}$                              |
| 62 | $(81^{\cos x})^{\sin x} = 9^{-\sqrt{3} \cos x}$                                      | $\left[ -2\pi, -\frac{\pi}{2} \right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^{k+1} \frac{\pi}{3} + \pi k; n, k \in \mathbb{Z};$ б) $-\frac{3\pi}{2}; -\frac{2\pi}{3}; -\frac{\pi}{2}$                                                     |

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|----|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63 | $(27^{\cos x})^{\sin x} = 3^{\frac{3 \cos x}{2}}$                                    | $\left[-\pi; \frac{\pi}{2}\right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $\pm \frac{\pi}{2}; \frac{\pi}{6}$                                |
| 64 | $(36^{\sin x})^{\cos x} = 6^{\sqrt{2} \sin x}$                                       | $\left[2\pi; \frac{7\pi}{2}\right]$<br>а) $\pi n; \pm \frac{\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $2\pi; \frac{9\pi}{4}; 3\pi$                                                       |
| 65 | $(36^{\sin x})^{-\cos x} = 6^{\sin x}$                                               | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\pi n; \pm \frac{2\pi}{3} + 2\pi k; n, k \in \mathbb{Z};$ б) $-\frac{10\pi}{3}; -3\pi; -\frac{8\pi}{3}; -2\pi$                               |
| 66 | $(5\sqrt{\cos x} - 1)(5 - 4\cos x) = 0$                                              | $\left[\frac{7\pi}{2}; 4\pi\right]$<br>а) $\pm \arccos \frac{1}{5} + 2\pi k; k \in \mathbb{Z};$ б) $4\pi - \arccos \frac{1}{5}$                                                           |
| 67 | $\cos\left(\frac{3\pi}{2} - 2x\right) = \sqrt{2} \sin x$                             | $\left[3\pi; \frac{9\pi}{2}\right]$<br>а) $\pi n; \pm \frac{3\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $3\pi; \frac{13\pi}{4}; 4\pi$                                                     |
| 68 | $\sin 2x = \sqrt{3} \sin\left(\frac{3\pi}{2} - x\right)$                             | $[3\pi; 4\pi]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^{k+1} \frac{\pi}{3} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{10\pi}{3}; \frac{7\pi}{2}; \frac{11\pi}{3}$                                |
| 69 | $\sin 2x = \sin\left(\frac{\pi}{2} + x\right)$                                       | $\left[-\frac{7\pi}{2}; -\frac{5\pi}{2}\right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $-\frac{5\pi}{2}; -\frac{7\pi}{2}; -\frac{19\pi}{6}$ |
| 70 | $\sin 2x = \cos\left(\frac{3\pi}{2} + x\right)$                                      | $\left[\frac{3\pi}{2}; \frac{5\pi}{2}\right]$<br>а) $\pi n; \pm \frac{\pi}{3} + 2\pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{3}; 2\pi; \frac{7\pi}{3}$                                   |
| 71 | $\sin 2x = \sqrt{3} \cos\left(\frac{3\pi}{2} - x\right)$                             | $[-3\pi; -2\pi]$<br>а) $\pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $-3\pi; -\frac{17\pi}{6}; -2\pi$                                                                     |
| 72 | $\sin 2x = \sqrt{2} \sin\left(\frac{\pi}{2} - x\right)$                              | $\left[\frac{5\pi}{2}; \frac{7\pi}{2}\right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{4} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{2}; \frac{7\pi}{2}; \frac{11\pi}{4}$      |
| 73 | $2 \sin^2 x = \cos\left(\frac{3\pi}{2} - x\right)$                                   | $\left[-\frac{5\pi}{2}; -\pi\right]$<br>а) $\pi n; (-1)^{k+1} \frac{5\pi}{6} + \pi k; n, k \in \mathbb{Z};$ б) $-\frac{13\pi}{6}; -2\pi; -\pi$                                            |
| 74 | $2 \sin^2 x = \sqrt{3} \cos\left(\frac{\pi}{2} + x\right)$                           | $\left[\frac{3\pi}{2}; 3\pi\right]$<br>а) $\pi n; (-1)^{k+1} \frac{\pi}{3} + \pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{3}; 2\pi; 3\pi$                                                 |
| 75 | $2 \cos^2 x = \sqrt{3} \sin\left(\frac{3\pi}{2} + x\right)$                          | $\left[\pi; \frac{5\pi}{2}\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $\frac{7\pi}{6}; \frac{3\pi}{2}; \frac{5\pi}{2}$                   |
| 76 | $2 \cos^2 x = \sqrt{3} \sin\left(\frac{3\pi}{2} + x\right)$                          | $\left[\frac{3\pi}{2}; 3\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $\frac{3\pi}{2}; \frac{5\pi}{2}; \frac{17\pi}{6}$                 |
| 77 | $\sqrt{2} \cos^2 x = \sin\left(\frac{\pi}{2} + x\right)$                             | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $-\frac{7\pi}{2}; -\frac{5\pi}{2}; -\frac{9\pi}{4}$              |
| 78 | $2 \cos^2 x = \sin\left(\frac{\pi}{2} - x\right)$                                    | $\left[\frac{5\pi}{2}; 4\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{\pi}{3} + 2\pi k; n, k \in \mathbb{Z};$ б) $\frac{5\pi}{2}; \frac{7\pi}{2}; \frac{11\pi}{3}$                  |
| 79 | $2 \cos^2 x = \sqrt{3} \sin\left(\frac{3\pi}{2} - x\right)$                          | $\left[-\frac{\pi}{2}; \pi\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{5\pi}{6} + 2\pi k; n, k \in \mathbb{Z};$ б) $\pm \frac{\pi}{2}; \frac{5\pi}{6}$                                |
| 80 | $\sqrt{2} \cos^2 x = \sin\left(x - \frac{\pi}{2}\right)$                             | $\left[-\frac{3\pi}{2}; -\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; \pm \frac{3\pi}{4} + 2\pi k; n, k \in \mathbb{Z};$ б) $-\frac{5\pi}{4}; -\frac{3\pi}{2}$                               |
| 81 | $\sin 2x - 2\sqrt{3} \cos^2 x - 4 \sin x + 4\sqrt{3} \cos x = 0$                     | $\left[\pi; \frac{5\pi}{2}\right]$<br>а) $\frac{\pi}{3} + \pi k; k \in \mathbb{Z};$ б) $\frac{4\pi}{3}; \frac{7\pi}{3}$                                                                   |
| 82 | $7 \sin^2 x + 4 \sin x \cos x - 3 \cos^2 x = 0$                                      | $\left[\frac{3\pi}{2}; \frac{5\pi}{2}\right]$<br>а) $-\frac{\pi}{4} + \pi n; \arctg \frac{3}{7} + \pi k; n, k \in \mathbb{Z}$ б) $\frac{7\pi}{4}; 2\pi + \arctg \frac{3}{7}$              |
| 83 | $19 \cdot 4^x - 5 \cdot 2^{x+2} + 1 = 0$                                             | $[-5; -4]$<br>а) 0; $-\log_2 19;$ б) $-\log_2 19$                                                                                                                                         |

| №   | а) Решите уравнение. б) Найдите все корни этого уравнения, принадлежащие промежутку.              | Ответ                                                                                                                                                                                                                                                     |
|-----|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 84  | $7^{x^2-2x} + 7^{x^2-2x-1} = 56$                                                                  | $[-1; 1]$<br>а) $1 \pm \sqrt{3}$ ; б) $1 - \sqrt{3}$                                                                                                                                                                                                      |
| 85  | $15^{\cos x} = 3^{\cos x} \cdot (0,2)^{-\sin x}$                                                  | $\left[-3\pi; \frac{3\pi}{2}\right]$<br>а) $\frac{\pi}{4} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{11\pi}{4}; -\frac{7\pi}{4}; -\frac{3\pi}{4}; \frac{\pi}{4}; \frac{5\pi}{4}$                                                                             |
| 86  | $\cos 2x + 2\cos^2 x - \sin 2x = 0$                                                               | $\left[\frac{3\pi}{2}; \frac{5\pi}{2}\right]$<br>а) $\frac{\pi}{4} + \pi k; -\arctg 3 + \pi n, n, k \in \mathbb{Z}$ ; б) $2\pi - \arctg 3; \frac{9\pi}{4}$                                                                                                |
| 87  | $3\sin^2 x + 5\sin x + 2 = 0$                                                                     | $\left[-\frac{\pi}{2}; 2\pi\right]$<br>а) $-\frac{\pi}{2} + 2\pi k; (-1)^{n+1} \arcsin \frac{2}{3} + \pi n, n, k \in \mathbb{Z}$ ;<br>б) $\pm \frac{\pi}{2}; \frac{3\pi}{2}; -\arcsin \frac{2}{3}; \pi + \arcsin \frac{2}{3}; 2\pi - \arcsin \frac{2}{3}$ |
| 88  | $2\sin^3 x - 2\sin x + \cos^2 x = 0$                                                              | $\left[-\frac{7\pi}{2}; -2\pi\right]$<br>а) $\frac{\pi}{2} + \pi n; (-1)^k \frac{\pi}{6} + \pi k, n, k \in \mathbb{Z}$ ; б) $-\frac{19\pi}{6}; -\frac{7\pi}{2}; -\frac{5\pi}{2}$                                                                          |
| 89  | $2\sin^2 x - 3\cos x - 3 = 0$                                                                     | $[\pi; 3\pi]$<br>а) $\pi + 2\pi n; \pm \frac{2\pi}{3} + 2\pi k, n, k \in \mathbb{Z}$ ; б) $\pi; \frac{4\pi}{3}; \frac{8\pi}{3}; 3\pi$                                                                                                                     |
| 90  | $6\cos 2x - 14\cos^2 x - 7\sin 2x = 0$                                                            | $\left[-\frac{3\pi}{2}; \frac{\pi}{2}\right]$<br>а) $-\frac{\pi}{4} + \pi k; -\arctg \frac{4}{3} + \pi n, n, k \in \mathbb{Z}$ ;<br>б) $-\pi - \arctg \frac{4}{3}; -\frac{5\pi}{4}; -\arctg \frac{4}{3}; -\frac{\pi}{4}$                                  |
| 91  | $2\sin^2 x + (2 - \sqrt{2})\cos x + \sqrt{2} - 2 = 0$                                             | $\left[\frac{5\pi}{2}; \frac{7\pi}{2}\right]$<br>а) $2\pi n; \pm \frac{3\pi}{4} + 2\pi k, n, k \in \mathbb{Z}$ ; б) $\frac{11\pi}{4}; \frac{13\pi}{4}$                                                                                                    |
| 92  | $2\cos^2 x + (2 - \sqrt{2})\sin x + \sqrt{2} - 2 = 0$                                             | $[-3\pi; -2\pi]$<br>а) $\frac{\pi}{2} + 2\pi n; \pm \frac{3\pi}{4} + 2\pi k, n, k \in \mathbb{Z}$ ; б) $-\frac{11\pi}{4}; -\frac{9\pi}{4}$                                                                                                                |
| 93  | $\frac{1}{\cos^2 x} + \frac{1}{\sin\left(x - \frac{\pi}{2}\right)} = 2$                           | $\left[-2\pi; -\frac{\pi}{2}\right]$                                                                                                                                                                                                                      |
| 94  | $\frac{1}{\operatorname{tg}^2 x} - \frac{3}{\sin x} + 3 = 0$                                      | $\left[-4\pi; -\frac{5\pi}{2}\right]$                                                                                                                                                                                                                     |
| 95  | $\sqrt{2} \sin\left(\frac{3\pi}{2} - x\right) \cdot \cos\left(\frac{3\pi}{2} + x\right) = \cos x$ | $[-4\pi; -3\pi]$                                                                                                                                                                                                                                          |
| 96  | $6^{x^2-4x} + 6^{x^2-4x-1} = 42$                                                                  | $[-2; 4]$                                                                                                                                                                                                                                                 |
| 97  | $5^{x^2-4x+1} + 5^{x^2-4x} = 30$                                                                  | $[-1; 3]$                                                                                                                                                                                                                                                 |
| 98  | $6\sin^2 x - 5\sin x - 4 = 0$                                                                     | $\left[-\frac{7\pi}{2}; -\frac{3\pi}{2}\right]$                                                                                                                                                                                                           |
| 99  | $2 \cdot 9^{x^2-4x+1} + 42 \cdot 6^{x^2-4x} - 15 \cdot 4^{x^2-4x+1} = 0$                          | $[-1; 3]$                                                                                                                                                                                                                                                 |
| 100 | $\frac{3\operatorname{ctg}^2 x + 4\operatorname{ctg} x}{5\cos^2 x - 4\cos x} = 0$                 |                                                                                                                                                                                                                                                           |
| 101 | $7\sin^2 x + 8\cos x - 8 = 0$                                                                     | $\left[-\frac{\pi}{2}; \frac{\pi}{2}\right]$                                                                                                                                                                                                              |
| 102 | $\frac{\sin 2x}{\cos\left(x + \frac{3\pi}{2}\right)} = 1$                                         | $\left[-4\pi; -\frac{5\pi}{2}\right]$                                                                                                                                                                                                                     |
| 103 | $5\cos^2 x - 12\cos x + 4 = 0$                                                                    | $\left[-\frac{5\pi}{2}; -\pi\right]$                                                                                                                                                                                                                      |

| №   | а) Решите уравнение. б) Найдите все корни этого уравнения, принадлежащие промежутку.           | Ответ                                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 104 | $6\sin^2 x + 7\cos x - 7 = 0$                                                                  | $[-3\pi; -\pi]$                                                                                                                                    |
| 105 | $\cos 4x - \cos 2x = 0$                                                                        | $\left[\frac{\pi}{2}; 2\pi\right]$                                                                                                                 |
| 106 | $5 \cdot 4^{x^2-4x} + 20 \cdot 10^{x^2+4x-1} - 7 \cdot 25^{x^2+4x} = 0$                        | $[-3; 1]$                                                                                                                                          |
| 107 | $2\sin(\pi + x) \cdot \cos\left(\frac{\pi}{2} + x\right) = \sin x$                             | $[-5\pi; -4\pi]$                                                                                                                                   |
| 108 | $7\sin^2 x + 4\sin x \cos x - 3\cos^2 x = 0$                                                   | $\left[\frac{3\pi}{2}; \frac{5\pi}{2}\right]$                                                                                                      |
| 109 | $\operatorname{tg}^2 x + 5\operatorname{tg} x + 6 = 0$                                         | $\left[-2\pi; -\frac{\pi}{2}\right]$                                                                                                               |
| 110 | $\frac{(\operatorname{tg} x + \sqrt{3}) \log_{13}(2\sin^2 x)}{\log_{31}(\sqrt{2} \cos x)} = 0$ |                                                                                                                                                    |
| 111 | $4^x - 2^{x+3} + 12 = 0$                                                                       | $[2; 3]$                                                                                                                                           |
| 112 | $2\sin^2 x - 3 \operatorname{tg} x  \sqrt{\cos^2 x + 1} = 0$                                   | $\left[2\pi; \frac{7\pi}{2}\right]$ а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{13\pi}{6}; \frac{17\pi}{6}; \frac{19\pi}{6}$      |
| 113 | $\frac{ \sin 2x }{\sqrt{\cos^2 x}} = 3 - \frac{1}{ \sin x }$                                   | $\left[-4\pi; -\frac{5\pi}{2}\right]$ а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{23\pi}{6}; -\frac{19\pi}{6}; -\frac{17\pi}{6}$ |
| 114 | $(6\cos^2 x + 5\cos x - 4)\sqrt{23\sin x} = 0$                                                 | $\left(-2\pi; -\frac{\pi}{2}\right)$ а) $\frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{5\pi}{3}; -\pi$                                    |
| 115 | $2\cos^2 x - 3 \operatorname{ctg} x  \sqrt{\sin^2 x + 1} = 0$                                  | $\left[-\frac{5\pi}{2}; -\pi\right]$ а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{4\pi}{3}; -\frac{5\pi}{3}; -\frac{7\pi}{3}$     |
| 116 | $\frac{ \sin 2x }{\sqrt{\sin^2 x}} = 3 - \frac{1}{ \cos x }$                                   | $\left[\pi; \frac{5\pi}{2}\right]$ а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{4\pi}{3}; \frac{5\pi}{3}; \frac{7\pi}{3}$          |
| 117 | $(6\cos^2 x - 11\cos x + 4)\sqrt{-3\sin x} = 0$                                                | $\left(-\pi; \frac{\pi}{2}\right)$ а) $-\frac{\pi}{3} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\frac{\pi}{3}; 0$                                         |
| 118 | $2 \operatorname{ctg} x  \sqrt{\sin^2 x} = 5 - \frac{2}{ \cos x }$                             | $\left[\pi; \frac{5\pi}{2}\right]$ а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{4\pi}{3}; \frac{5\pi}{3}; \frac{7\pi}{3}$          |
| 119 | $2 \operatorname{ctg} x  \sqrt{\sin^2 x} = 9 - \frac{4}{ \cos x }$                             | $\left[\frac{3\pi}{2}; 3\pi\right]$ а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{5\pi}{3}; \frac{7\pi}{3}; \frac{8\pi}{3}$         |
| 120 | $(4\sin^2 x - 4\sin x - 3)\sqrt{2\cos x} = 0$                                                  | $\left(-\frac{3\pi}{2}; 0\right)$ а) $-\frac{\pi}{6} + 2\pi k, \frac{\pi}{2} + \pi k, k \in \mathbb{Z}$ ; б) $-\frac{\pi}{6}; -\frac{\pi}{2}$      |
| 121 | $6 \operatorname{ctg} x  \sqrt{\sin^2 x} = 1 + \frac{1}{ \cos x }$                             | $\left[-\frac{\pi}{2}; \pi\right]$ а) $\pm \frac{\pi}{3} + \pi k, k \in \mathbb{Z}$ ; б) $\pm \frac{\pi}{3}; \frac{2\pi}{3}$                       |
| 122 | $\frac{2\sin^2 x - \sin x}{2\cos x + \sqrt{3}} = 0$                                            | $\left[\pi; \frac{5\pi}{2}\right]$ а) $\pi k, \frac{\pi}{6} + 2\pi k, k \in \mathbb{Z}$ ; б) $\pi; 2\pi; \frac{13\pi}{6}$                          |
| 123 | $\frac{2\sin^2 x + \sin x}{2\cos x - \sqrt{3}} = 0$                                            | $\left[-\frac{3\pi}{2}; 0\right]$ а) $\pi k, -\frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z}$ ; б) $-\pi; -\frac{5\pi}{6}; 0$                           |
| 124 | $2\sin^4 x + 3\cos 2x + 1 = 0$                                                                 | $[\pi; 3\pi]$ а) $\frac{\pi}{2} + \pi k, k \in \mathbb{Z}$ ; б) $\frac{3\pi}{2}; \frac{5\pi}{2}$                                                   |

| №   | а) Решите уравнение. б) Найдите все корни этого уравнения, принадлежащие промежутку. | Ответ                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 125 | $4\sin^4 2x + 3\cos 4x - 1 = 0$                                                      | $\left[\pi; \frac{3\pi}{2}\right]$ а) $\frac{\pi}{4} + \frac{\pi k}{2}; \frac{\pi}{8} + \frac{\pi k}{4}; k \in \mathbb{Z};$ б) $\frac{9\pi}{8}; \frac{5\pi}{4}; \frac{11\pi}{8}$ |
| 126 | $4\cos^4 x - 4\cos^2 x + 1 = 0$                                                      | $[-2\pi; -\pi]$ а) $\frac{\pi}{4} + \frac{\pi k}{2}; k \in \mathbb{Z};$ б) $-\frac{7\pi}{4}; -\frac{5\pi}{4}$                                                                    |
| 127 | $16\cos^4 x - 24\cos^2 x + 9 = 0$                                                    | $[2\pi; 3\pi]$ а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z};$ б) $\frac{13\pi}{6}; \frac{17\pi}{6}$                                                                           |
| 128 | $\frac{2\sin^2 x - \sin x}{2\cos x - \sqrt{3}} = 0$                                  | $\left[\frac{3\pi}{2}; 3\pi\right]$ а) $\pi k, \frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z};$ б) $2\pi; \frac{17\pi}{6}; 3\pi$                                                      |
| 129 | $\frac{2\sin^2 x - \sqrt{3}\sin x}{2\cos x + 1} = 0$                                 | $\left[2\pi; \frac{7\pi}{2}\right]$ а) $\pi k, \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z};$ б) $2\pi; \frac{7\pi}{3}; 3\pi$                                                        |
| 130 | $\frac{5\cos x + 4}{4\operatorname{tg} x - 3} = 0$                                   | $\left[-4\pi; -\frac{5\pi}{2}\right]$ а) $\pi - \arccos \frac{4}{5} + 2\pi k, k \in \mathbb{Z};$ б) $-3\pi - \arccos \frac{4}{5}$                                                |
| 131 | $\frac{5\operatorname{tg} x - 12}{13\cos x - 5} = 0$                                 | $\left[4\pi; \frac{11\pi}{2}\right]$ а) $\arctg \frac{12}{5} + \pi + 2\pi k, k \in \mathbb{Z};$ б) $5\pi + \arctg \frac{12}{5}$                                                  |
| 132 | $9^{\cos x} + 9^{-\cos x} = \frac{10}{3}$                                            | $\left[2\pi; \frac{7\pi}{2}\right]$                                                                                                                                              |
| 133 | $4^{\cos x} + 4^{-\cos x} = \frac{5}{2}$                                             | $\left[-3\pi; -\frac{3\pi}{2}\right]$                                                                                                                                            |
| 134 | $4^{\sin x} + 4^{-\sin x} = \frac{5}{2}$                                             | $\left[\frac{5\pi}{2}; 4\pi\right]$                                                                                                                                              |
| 135 | $9^{\sin x} + 9^{-\sin x} = \frac{10}{3}$                                            | $\left[-\frac{7\pi}{2}; -2\pi\right]$ а) $\pm \frac{\pi}{6} + \pi k, k \in \mathbb{Z};$ б) $-\frac{19\pi}{6}; -\frac{17\pi}{6}; -\frac{13\pi}{6}$                                |
| 136 | $\sin 2x = \sin\left(\frac{5\pi}{2} + x\right)$                                      | $\left[\frac{7\pi}{2}; \frac{9\pi}{2}\right]$                                                                                                                                    |
| 137 | $(\sqrt{2})^{2\cos x} = \frac{1}{2 \cdot 2^{\cos x}}$                                | $\left[\frac{5\pi}{2}; 4\pi\right]$                                                                                                                                              |
| 138 | $2(1 + \operatorname{tg}^2 x)\sin 2x = -\frac{1}{\cos^2 x}$                          | $[-3\pi; -2\pi]$                                                                                                                                                                 |
| 139 | $(\sqrt{3})^{2\sin x} = \frac{1}{3 \cdot 3^{\sin x}}$                                | $\left[-3\pi; -\frac{3\pi}{2}\right]$                                                                                                                                            |
| 140 | $2(1 + \operatorname{ctg}^2 x)(\cos^2 x - \sin^2 x) = \frac{1}{\sin^2 x}$            | $[-3\pi; -2\pi]$                                                                                                                                                                 |
| 141 | $\operatorname{tg} x - \sqrt{2} \sin x  = 0$                                         | $\left[-2\pi; \frac{\pi}{4}\right]$                                                                                                                                              |
| 142 | $\operatorname{ctg} x - \sqrt{2} \cos x  = 0$                                        | $\left[\frac{\pi}{4}; \frac{5\pi}{2}\right]$                                                                                                                                     |
| 143 | $6\sin^2 x + 5\sin\left(\frac{\pi}{2} + x\right) - 2 = 0$                            | $\left[-5\pi; -\frac{7\pi}{2}\right]$ а) $\pm \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{14\pi}{3}$                                                                  |
| 144 | $4\sin^2 x + 8\sin\left(\frac{3\pi}{2} + x\right) + 1 = 0$                           | $\left[-3\pi; -\frac{3\pi}{2}\right]$ а) $\pm \frac{\pi}{3} + 2\pi k, k \in \mathbb{Z};$ б) $-\frac{5\pi}{3}$                                                                    |
| 145 | $\sin x + \cos^2 \frac{x}{2} = \sin^2 \frac{x}{2}$                                   | $\left[-2\pi; \frac{11\pi}{4}\right]$ а) $-\frac{\pi}{4} + \pi n, n \in \mathbb{Z};$ б) $-\frac{5\pi}{4}; -\frac{\pi}{4}; \frac{3\pi}{4}; \frac{7\pi}{4}$                        |
| 146 | $\sin 2x + \sin x = 2\cos x + 1$                                                     | $\left(-\frac{3\pi}{2}; 2\pi\right]$ а) $\pm \frac{2\pi}{3} + 2\pi k; \frac{\pi}{2} + 2\pi n, n, k \in \mathbb{Z}$ б) $\pm \frac{2\pi}{3}; \pm \frac{4\pi}{3}; \frac{\pi}{2}$    |

| №   | а) Решите уравнение. б) Найдите все корни этого уравнения, принадлежащие промежутку.     | Ответ                                                                                                                                                                         |
|-----|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 147 | $2 \cos 2x + 4 \sin\left(\frac{3\pi}{2} + x\right) - 1 = 0$                              | $[-3\pi; -\pi]$<br>$a) \pm \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z}; \quad б) -\frac{8\pi}{3}; -\frac{4\pi}{3}$                                                              |
| 148 | $\sin^2 \frac{x}{2} - \cos^2 \frac{x}{2} = \cos 2x$                                      | $\left[-\frac{\pi}{2}; \pi\right)$<br>$a) \pm \frac{\pi}{3} + 2\pi k, \pi + 2\pi n, k, n \in \mathbb{Z}; \quad б) \pm \frac{\pi}{3}$                                          |
| 149 | $\sin^4 x + 5 \sin^3 x + 5 \sin^2 x - 5 \sin x - 6 = 0$                                  | $\left[-\frac{\pi}{2}; \frac{7\pi}{2}\right]$<br>$a) \frac{\pi}{2} + \pi n, n \in \mathbb{Z}; \quad б) \pm \frac{\pi}{2}; \frac{3\pi}{2}; \pm \frac{5\pi}{2}; \frac{7\pi}{2}$ |
| 150 | $2 \cdot \left(\frac{1}{2}\right)^{\cos 2x} = 4^{\sin x \cos x}$                         | $\left(-\frac{7\pi}{2}; -2\pi\right)$                                                                                                                                         |
| 151 | $\sqrt{-\cos x} \cdot (9^{x+1} - 28 \cdot 3^x + 3) = 0$                                  | $\left[-\frac{3\pi}{4}; \frac{3\pi}{4}\right]$<br>$a) -2; \frac{\pi}{2} + \pi n, n \in \mathbb{Z}; \quad б) -2; \pm \frac{\pi}{2}$                                            |
| 152 | $\left(\frac{4}{9}\right)^{\cos x} + 2 \cdot \left(\frac{2}{3}\right)^{\cos x} - 3 = 0$  | $[\pi; 4\pi]$<br>$a) \frac{\pi}{2} + \pi n, n \in \mathbb{Z}; \quad б) \frac{3\pi}{2}; \frac{5\pi}{2}; \frac{7\pi}{2}$                                                        |
| 153 | $\left(\frac{1}{16}\right)^{\cos x} + 3 \cdot \left(\frac{1}{4}\right)^{\cos x} - 4 = 0$ | $[4\pi; 7\pi]$<br>$a) \frac{\pi}{2} + \pi n, n \in \mathbb{Z}; \quad б) \frac{9\pi}{2}; \frac{11\pi}{2}; \frac{13\pi}{2}$                                                     |
| 154 | $\frac{\sin 2x}{\sin\left(x + \frac{3\pi}{2}\right)} = -\sqrt{2}$                        | $\left[\frac{5\pi}{2}; 4\pi\right]$<br>$a) \frac{\pi}{4} + 2\pi k, \frac{3\pi}{4} + 2\pi k, k \in \mathbb{Z}; \quad б) \frac{11\pi}{4}$                                       |
| 155 | $\frac{\sin 2x}{\sin\left(\frac{\pi}{2} + x\right)} = -1$                                | $\left[\pi; \frac{5\pi}{2}\right]$<br>$a) -\frac{\pi}{6} + 2\pi k, -\frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z}; \quad б) \frac{7\pi}{6}; \frac{11\pi}{6}$                      |
| 156 | $\frac{\sin 2x}{\sin\left(\frac{\pi}{2} + x\right)} = \sqrt{3}$                          | $\left[-\frac{5\pi}{2}; -\pi\right]$<br>$a) \frac{\pi}{3} + 2\pi k, \frac{2\pi}{3} + 2\pi k, k \in \mathbb{Z}; \quad б) -\frac{5\pi}{3}; -\frac{4\pi}{3}$                     |
| 157 | $\frac{\sin 2x}{\cos(\pi - x)} = \sqrt{2}$                                               | $\left[-3\pi; -\frac{3\pi}{2}\right]$<br>$a) -\frac{\pi}{4} + 2\pi k, -\frac{3\pi}{4} + 2\pi k, k \in \mathbb{Z}; \quad б) -\frac{11\pi}{4}; -\frac{9\pi}{4}$                 |
| 158 | $\operatorname{tg} x - \sin 2x = 0$                                                      | $\left[-\frac{\pi}{2}; \pi\right]$<br>$a) \pi n; \frac{\pi}{4} + \frac{\pi n}{2}, n \in \mathbb{Z}; \quad б) 0; \pm \frac{\pi}{4}; \frac{3\pi}{4}; \pi$                       |
| 159 | $\operatorname{tg} x - 2 \sin 2x = 0$                                                    | $\left[-\pi; \frac{\pi}{2}\right]$<br>$a) \frac{\pi n}{3}, n \in \mathbb{Z}; \quad б) -\pi; -\frac{2\pi}{3}; \pm \frac{\pi}{3}; 0$                                            |
| 160 | $3 \operatorname{tg} x - 2 \sin 2x = 0$                                                  | $\left[\pi; \frac{5\pi}{2}\right]$<br>$a) \pi n; \pm \frac{\pi}{6} + \pi n, n \in \mathbb{Z}; \quad б) \pi; \frac{7\pi}{6}; \frac{11\pi}{6}; 2\pi; \frac{13\pi}{6}$           |
| 161 |                                                                                          |                                                                                                                                                                               |
| 162 |                                                                                          |                                                                                                                                                                               |
| 163 |                                                                                          |                                                                                                                                                                               |
| 164 |                                                                                          |                                                                                                                                                                               |
| 165 |                                                                                          |                                                                                                                                                                               |
| 166 |                                                                                          |                                                                                                                                                                               |
| 167 |                                                                                          |                                                                                                                                                                               |