

Контрольная домашняя работа № 8

1. Найдите значения других трех основных тригонометрических функций

1. $\sin \alpha = \frac{12}{13}, \frac{\pi}{2} < \alpha < \pi;$
2. $\cos \alpha = -0,6, \frac{\pi}{2} < \alpha < \pi;$
3. $\sin \alpha = -\frac{3}{5}, \frac{3\pi}{2} < \alpha < 2\pi;$
4. $\sin \alpha = -0,8, \pi < \alpha < \frac{3\pi}{2};$
5. $\cos \alpha = -\frac{5}{13}, \pi < \alpha < \frac{3\pi}{2};$
6. $\cos \alpha = \frac{12}{13}, \frac{3\pi}{2} < \alpha < 2\pi;$
7. $\sin \alpha = -0,6, \pi < \alpha < \frac{3\pi}{2};$
8. $\sin \alpha = \frac{5}{13}, \frac{\pi}{2} < \alpha < \pi;$
9. $\cos \alpha = -\frac{3}{5}, \frac{\pi}{2} < \alpha < \pi;$
10. $\sin \alpha = -\frac{12}{13}, \frac{3\pi}{2} < \alpha < 2\pi;$
11. $\cos \alpha = -0,8, \frac{\pi}{2} < \alpha < \pi;$
12. $\sin \alpha = -\frac{12}{13}, \pi < \alpha < \frac{3\pi}{2};$
13. $\cos \alpha = -0,6, \pi < \alpha < \frac{3\pi}{2};$
14. $\cos \alpha = -\frac{4}{5}, \frac{\pi}{2} < \alpha < \pi;$
15. $\sin \alpha = -\frac{5}{13}, \pi < \alpha < \frac{3\pi}{2};$
16. $\sin \alpha = \frac{3}{5}, \frac{\pi}{2} < \alpha < \pi;$
17. $\cos \alpha = -\frac{12}{13}, \pi < \alpha < \frac{3\pi}{2};$
18. $\cos \alpha = -\frac{3}{5}, \pi < \alpha < \frac{3\pi}{2};$
19. $\sin \alpha = \frac{4}{5}, \frac{\pi}{2} < \alpha < \pi;$
20. $\sin \alpha = 0,6, \frac{\pi}{2} < \alpha < \pi;$
21. $\cos \alpha = -\frac{5}{13}, \frac{\pi}{2} < \alpha < \pi;$
22. $\sin \alpha = 0,8, \frac{\pi}{2} < \alpha < \pi;$
23. $\cos \alpha = \frac{4}{5}, \frac{3\pi}{2} < \alpha < 2\pi;$
24. $\sin \alpha = -\frac{4}{5}, \pi < \alpha < \frac{3\pi}{2};$
25. $\cos \alpha = -0,8, \pi < \alpha < \frac{3\pi}{2};$
26. $\sin \alpha = -\frac{3}{5}, \pi < \alpha < \frac{3\pi}{2};$
27. $\cos \alpha = -\frac{4}{5}, \pi < \alpha < \frac{3\pi}{2};$
28. $\cos \alpha = 0,8, \frac{3\pi}{2} < \alpha < 2\pi;$
29. $\sin \alpha = -\frac{4}{5}, \frac{3\pi}{2} < \alpha < 2\pi;$
30. $\cos \alpha = -\frac{12}{13}, \frac{\pi}{2} < \alpha < \pi.$

2. Упростите

1. $(\sin \alpha - \cos \alpha)^2 + \sin 2\alpha;$
2. $\frac{(1 - \cos \alpha)(1 + \cos \alpha)}{\sin \alpha};$
3. $\frac{1}{\operatorname{tg} \alpha} + \frac{\sin \alpha}{1 + \cos \alpha};$
10. $(\cos^2 \alpha + \operatorname{ctg}^2 \alpha + \sin^2 \alpha) \cdot \sin^2 \alpha;$
11. $\cos^2 \alpha - \cos^4 \alpha + \sin^4 \alpha;$
12. $(\sin^2 \alpha + \operatorname{tg}^2 \alpha \cdot \sin^2 \alpha) \cdot \operatorname{ctg} \alpha;$
13. $\frac{1 - 2 \cos^2 \beta}{\cos \beta + \sin \beta};$

4. $\frac{1 - 2 \sin \alpha \cos \alpha}{\sin \alpha - \cos \alpha} + \cos \alpha$;
5. $\frac{(1 - \sin \alpha)(1 + \sin \alpha)}{\cos \alpha}$;
6. $\frac{1 - \sin^2 \alpha}{\cos^2 \alpha} - (\cos \alpha \operatorname{tg} \alpha)^2$;
7. $\frac{\operatorname{tg} \alpha}{\operatorname{ctg} \alpha} + \operatorname{tg} \beta \cdot \operatorname{ctg} \beta$;
8. $\frac{1 - \sin^2 \alpha}{1 - \cos^2 \alpha} + \operatorname{tg} \alpha \cdot \operatorname{ctg} \alpha$;
9. $(1 - \sin^2 \alpha)(1 + \operatorname{tg}^2 \alpha)$;
20. $(\sin \alpha + \cos \alpha)^2 - \sin 2\alpha$;
21. $(1 - \cos^2 \alpha)(1 + \operatorname{ctg}^2 \alpha)$;
22. $\frac{\sin 2\alpha}{\sin \alpha} - \operatorname{ctg} \alpha \cdot \sin \alpha$;
23. $\frac{\sin 2\alpha}{\cos^2 \alpha \operatorname{ctg} \alpha}$;
24. $\frac{1 + \sin 2\alpha}{(\sin \alpha + \cos \alpha)^2}$;
25. $\frac{\cos 2\alpha}{\cos \alpha - \sin \alpha}$;
14. $\frac{\sin^2 \alpha - 1}{\cos^4 \alpha} + \operatorname{tg}^2 \alpha$;
15. $\frac{1 - \cos \alpha + \cos 2\alpha}{\sin 2\alpha - \sin \alpha}$;
16. $\operatorname{ctg}^2 \alpha (1 - \cos 2\alpha) + \cos^2 \alpha$;
17. $\operatorname{tg}^2 \alpha - \sin^2 \alpha - \operatorname{tg}^2 \alpha \cdot \sin^2 \alpha$;
18. $(3 \sin \alpha + 2 \cos \alpha)^2 + (2 \sin \alpha - 3 \cos \alpha)^2$;
19. $\frac{\cos \beta \cdot \operatorname{tg} \beta}{\sin^2 \beta} - \operatorname{ctg} \beta \cdot \cos \beta$;
26. $\cos^4 \alpha - \sin^4 \alpha$;
27. $\frac{1 - \sin 2\alpha}{\cos \alpha - \sin \alpha}$;
28. $\sin^2 \beta (1 + \operatorname{ctg} \beta) + \cos^2 \beta (1 + \operatorname{tg} \beta)$;
29. $\frac{\cos^4 \alpha - \sin^4 \alpha}{\cos 2\alpha}$;
30. $\frac{\cos 2\alpha - \cos^2 \alpha}{1 - \cos^2 \alpha}$.

3. Упрощение

1. $\sin 2\alpha \cdot \cos 3\alpha - \cos 2\alpha \cdot \sin 3\alpha - \sin \alpha$;
2. $\sin 2\alpha \cdot \sin 3\alpha - \cos 2\alpha \cdot \cos 3\alpha + \cos 5\alpha$;
3. $\sin \frac{2\pi}{15} \cdot \cos \frac{\pi}{5} + \cos \frac{2\pi}{15} \cdot \sin \frac{\pi}{5}$;
4. $\cos \frac{\pi}{7} \cdot \cos \frac{\pi}{42} - \sin \frac{\pi}{7} \cdot \sin \frac{\pi}{42}$;
5. $\left(\sin \frac{\pi}{7} \cdot \cos \frac{4\pi}{21} + \cos \frac{\pi}{7} \cdot \sin \frac{4\pi}{21} \right)^2$;
6. $(\cos 54^\circ \cdot \cos 9^\circ + \sin 54^\circ \cdot \sin 9^\circ) \cdot \sqrt{2}$;
7. $2 \cdot (\sin 12^\circ \cdot \cos 18^\circ + \cos 12^\circ \cdot \sin 18^\circ)$;
8. $\frac{\cos 65^\circ \cdot \cos 40^\circ + \sin 65^\circ \cdot \sin 40^\circ}{\sin 17^\circ \cdot \cos 8^\circ + \cos 17^\circ \cdot \sin 8^\circ}$;
9. $\sin x \cdot \sin 2x - \sin 3x - \cos x \cos 2x$;
10. $(\sin 38^\circ \cdot \cos 12^\circ + \cos 38^\circ \cdot \sin 12^\circ)^2 + (\cos 40^\circ \cdot \cos 10^\circ - \sin 40^\circ \cdot \sin 10^\circ)^2$;

11. $\cos x \cdot \sin 2x + \sin x - \cos 2x \cdot \sin x$;
12. $\cos \frac{1}{3}x \cdot \cos \frac{2}{3}x + \sin \frac{1}{3}x \cdot \sin \frac{2}{3}x - \frac{1}{2} \cos \frac{1}{3}x$;
13. $\sin 7\alpha \cdot \sin 4\alpha + \cos 4\alpha \cdot \cos 7\alpha - \cos 11\alpha$;
14. $\frac{\cos 40^\circ \cdot \cos 17^\circ + \sin 40^\circ \cdot \sin 17^\circ}{\sin 10^\circ \cdot \cos 13^\circ + \cos 10^\circ \cdot \sin 13^\circ}$;
15. $\sin 7\alpha \cdot \cos 4\alpha + \sin 4\alpha \cdot \cos 7\alpha - 3 \sin 11\alpha$;
16. $\left(\sin \frac{\pi}{3} \cdot \cos \frac{\pi}{12} - \cos \frac{\pi}{3} \cdot \sin \frac{\pi}{12} \right)^2$;
17. $\cos \frac{2\pi}{7} \cdot \cos \frac{5\pi}{42} + \sin \frac{2\pi}{7} \cdot \sin \frac{5\pi}{42}$;
18. $2 \cdot \left(\sin \frac{2\pi}{5} \cdot \cos \frac{\pi}{15} - \cos \frac{2\pi}{5} \cdot \sin \frac{\pi}{15} \right)$;
19. $\left(\cos \frac{\pi}{5} \cdot \cos \frac{\pi}{20} - \sin \frac{\pi}{5} \cdot \sin \frac{\pi}{20} \right) \cdot \sqrt{2}$;
20. $\frac{\sin 15^\circ \cdot \cos 10^\circ + \cos 15^\circ \cdot \sin 10^\circ}{\cos 5^\circ \cdot \cos 20^\circ - \sin 5^\circ \cdot \sin 20^\circ}$;
21. $\left(\sin 123^\circ \cdot \cos 33^\circ - \cos 123^\circ \cdot \sin 33^\circ \right)^2$;
22. $\sin 2x \cos 3x - 2 \sin 5x + \cos 2x \sin 3x$;
23. $\frac{\cos 39^\circ \cdot \cos 12^\circ + \sin 39^\circ \cdot \sin 12^\circ}{\sin 12^\circ \cdot \cos 15^\circ + \cos 12^\circ \cdot \sin 15^\circ}$;
24. $\cos 2,5x \cdot \cos 1,5x + \cos x + \sin 1,5x \cdot \sin 2,5x$;
25. $\left(\sin 35^\circ \cdot \cos 10^\circ - \cos 35^\circ \cdot \sin 10^\circ \right)^2 + \left(\cos 15^\circ \cdot \cos 10^\circ - \sin 15^\circ \cdot \sin 10^\circ \right)^2$;
26. $\cos 4x \cdot \cos 7x - \cos 3x + \sin 4x \cdot \sin 7x$;
27. $\left(\cos 104^\circ \cdot \cos 14^\circ + \sin 104^\circ \cdot \sin 14^\circ \right)^3$;
28. $\frac{\sin 28^\circ \cdot \cos 12^\circ + \cos 28^\circ \cdot \sin 12^\circ + \sin 40^\circ}{2}$;
29. $\frac{\sin 38^\circ \cdot \cos 12^\circ + \cos 38^\circ \cdot \sin 12^\circ}{\cos 40^\circ \cdot \cos 10^\circ - \sin 40^\circ \cdot \sin 10^\circ}$;
30. $\sin 4x \cos 3x - \sin 7x + \cos 4x \sin 3x$.

4. Вычислите:

1. $2 \cdot \left(\operatorname{arctg} \left(-\frac{\sqrt{3}}{3} \right) + \arccos 0 \right) - \operatorname{arccotg} \sqrt{3}$;
2. $\frac{\arcsin \left(-\frac{\sqrt{2}}{2} \right) + \arccos \frac{1}{2}}{\operatorname{arctg} 1}$;

$$3. \quad 2 \cdot \arccos 1 - \operatorname{arctg}(-\sqrt{3}) + \operatorname{arcctg} \frac{\sqrt{3}}{3};$$

$$4. \quad \arcsin \frac{1}{2} - \arccos \left(-\frac{\sqrt{3}}{2} \right) + \operatorname{arcctg}(-1);$$

$$5. \quad \frac{\operatorname{arcctg} \left(-\frac{\sqrt{3}}{3} \right) - \arcsin \left(-\frac{1}{2} \right)}{\arccos 0};$$

$$6. \quad \operatorname{arctg} \sqrt{3} - 2 \arcsin \left(-\frac{\sqrt{2}}{2} \right) - \arccos 0;$$

$$7. \quad 3 \cdot \arcsin \left(-\frac{1}{2} \right) + \arccos \left(-\frac{\sqrt{3}}{2} \right) - \operatorname{arcctg} 0;$$

$$8. \quad \frac{\arccos \left(-\frac{\sqrt{2}}{2} \right) - \arcsin 0}{\operatorname{arctg} 1};$$

$$9. \quad \arcsin \frac{1}{2} - \arccos \left(-\frac{\sqrt{3}}{2} \right) + \operatorname{arcctg}(-1);$$

$$10. \quad 3 \cdot \operatorname{arctg} \left(-\frac{\sqrt{3}}{3} \right) - 2 \cdot \arccos \frac{\sqrt{2}}{2} + \operatorname{arcctg}(-\sqrt{3});$$

$$12. \quad \arcsin 1 - \arccos \left(-\frac{\sqrt{2}}{2} \right) + 4 \cdot \operatorname{arcctg}(-1);$$

$$13. \quad 2 \cdot \arccos \frac{1}{2} - \operatorname{arctg}(-\sqrt{3}) + 2 \cdot \operatorname{arcctg} \frac{\sqrt{3}}{3};$$

$$14. \quad 2 \cdot \left(\arcsin \frac{\sqrt{2}}{2} - \arccos \left(-\frac{\sqrt{3}}{2} \right) \right) + \operatorname{arcctg} \sqrt{3};$$

$$15. \quad \frac{\arccos \left(-\frac{\sqrt{3}}{2} \right) - \arcsin \left(-\frac{1}{2} \right)}{\operatorname{arctg} \left(-\frac{\sqrt{3}}{3} \right)};$$

$$16. \quad 2 \cdot \left(\arccos \left(-\frac{\sqrt{2}}{2} \right) + \operatorname{arctg} 0 \right) - \arcsin \frac{\sqrt{3}}{2};$$

$$17. \quad \frac{\arccos \left(-\frac{\sqrt{2}}{2} \right) + \operatorname{arctg}(-1)}{\arcsin \frac{1}{2}};$$

$$18. \quad 2 \cdot \arcsin \left(-\frac{1}{2} \right) - \operatorname{arctg}(-\sqrt{3}) + \arccos \frac{\sqrt{3}}{2};$$

$$19. \quad \arcsin \left(-\frac{1}{2} \right) - \arccos \left(-\frac{\sqrt{2}}{2} \right) + \operatorname{arcctg}(-\sqrt{3});$$

$$11. \quad \frac{\operatorname{arctg} \sqrt{3} - \arccos \left(-\frac{1}{2} \right)}{\arcsin \frac{\sqrt{2}}{2}};$$

20. $\frac{\operatorname{arctg}\left(-\frac{\sqrt{3}}{3}\right) + \arcsin(-1)}{\arccos \frac{\sqrt{2}}{2}};$
21. $\operatorname{arccctg}(-1) - 2 \arccos\left(-\frac{\sqrt{2}}{2}\right) - 3 \arcsin 0;$
22. $3 \cdot \arccos \frac{1}{2} + \arcsin\left(-\frac{\sqrt{3}}{2}\right) - \operatorname{arctg} 0;$
23. $\frac{2 \arcsin\left(-\frac{\sqrt{2}}{2}\right) - \arccos 0}{\operatorname{arctg}(-1)};$
24. $2 \cdot \arcsin \frac{1}{2} - \arccos \frac{\sqrt{3}}{2} + \operatorname{arctg}(-\sqrt{3});$
25. $\operatorname{arccctg}\left(-\frac{\sqrt{3}}{3}\right) - 2 \cdot \arccos \frac{\sqrt{2}}{2} + \arcsin(-1);$
26. $\frac{\operatorname{arccctg}(-\sqrt{3}) - \arccos\left(-\frac{\sqrt{3}}{2}\right)}{\arcsin \frac{\sqrt{2}}{2}};$
27. $\arcsin\left(-\frac{1}{2}\right) + \arccos\left(-\frac{\sqrt{3}}{2}\right) + \operatorname{arccctg}(-\sqrt{3});$
28. $2 \cdot \arcsin \frac{1}{2} - \operatorname{arctg}(-\sqrt{3}) + 2 \cdot \operatorname{arccctg} \frac{\sqrt{3}}{3};$
29. $2 \cdot \left(\arcsin\left(-\frac{\sqrt{2}}{2}\right) + \arccos \frac{\sqrt{3}}{2} \right) + \operatorname{arctg} \sqrt{3};$
30. $\frac{\arcsin\left(-\frac{\sqrt{3}}{2}\right) - \arccos\left(-\frac{1}{2}\right)}{\operatorname{arccctg}(-1)}.$

5. Вычислите.

- | | |
|---|--|
| 1. $\sin\left(\arccos \frac{12}{13}\right), \operatorname{tg}(\arcsin(-0,6));$ | 12. $\cos(\operatorname{arccctg}(-4)), \operatorname{tg}\left(\arcsin \frac{3}{5}\right);$ |
| 2. $\cos(\operatorname{arctg}(-2)), \operatorname{ctg}\left(\arcsin \frac{3}{5}\right);$ | 13. $\sin(\arccos(-0,8)), \operatorname{tg}\left(\arcsin \frac{12}{13}\right);$ |
| 3. $\sin(\operatorname{arctg} 3), \cos(\arcsin(-0,8));$ | 14. $\cos(\operatorname{arctg} 4), \operatorname{ctg}\left(\arcsin\left(-\frac{4}{5}\right)\right);$ |
| 4. $\operatorname{tg}\left(\arccos \frac{5}{13}\right), \cos(\operatorname{arccctg}(-3));$ | 15. $\sin(\operatorname{arctg} 3), \cos(\arcsin(-0,8));$ |
| 5. $\operatorname{ctg}\left(\arccos\left(-\frac{4}{5}\right)\right), \sin(\operatorname{arctg} 2);$ | 16. $\operatorname{tg}\left(\arccos\left(-\frac{12}{13}\right)\right), \cos\left(\operatorname{arccctg} \frac{1}{2}\right);$ |

6. $\cos(\text{arcctg}(-3)), \text{tg}\left(\arcsin \frac{12}{13}\right);$
7. $\sin\left(\arccos\left(-\frac{3}{5}\right)\right), \text{tg}(\arcsin 0,6);$
8. $\cos(\text{arctg}3), \text{ctg}\left(\arcsin\left(-\frac{3}{5}\right)\right);$
9. $\sin(\text{arcctg}(-3)), \cos\left(\arcsin \frac{5}{13}\right);$
10. $\text{tg}\left(\arccos\left(-\frac{5}{13}\right)\right), \cos(\text{arcctg}2);$
11. $\text{ctg}\left(\arccos\left(-\frac{4}{5}\right)\right), \sin(\text{arctg}2);$
12. $\cos(\text{arctg}2), \text{tg}\left(\arcsin \frac{5}{13}\right);$
13. $\sin(\text{arctg}2), \cos\left(\arcsin\left(-\frac{5}{13}\right)\right);$
14. $\text{tg}(\arccos(-0,6)), \cos(\text{arcctg}5);$
15. $\text{ctg}\left(\arccos\left(-\frac{3}{5}\right)\right), \sin\left(\text{arctg} \frac{1}{2}\right);$
16. $\cos(\text{arctg}2), \text{tg}\left(\arcsin \frac{5}{13}\right);$
17. $\text{ctg}\left(\arccos\left(-\frac{12}{13}\right)\right), \sin(\text{arctg}4);$
18. $\cos\left(\text{arcctg}\left(-\frac{1}{2}\right)\right), \text{tg}(\arcsin 0,8);$
19. $\sin\left(\arccos \frac{12}{13}\right), \text{tg}(\arcsin(-0,6));$
20. $\cos\left(\text{arctg} \frac{1}{2}\right), \text{ctg}(\arcsin(-0,8));$
21. $\sin(\text{arcctg}2), \cos\left(\arcsin\left(-\frac{5}{13}\right)\right);$
22. $\text{tg}(\arccos(-0,6)), \cos(\text{arcctg}5);$
23. $\text{ctg}\left(\arccos\left(-\frac{3}{5}\right)\right), \sin\left(\text{arctg} \frac{1}{2}\right);$
24. $\cos(\text{arcctg}4), \text{tg}\left(\arcsin\left(-\frac{12}{13}\right)\right);$
25. $\cos\left(\text{arcctg} \frac{1}{2}\right), \text{ctg}(\arccos(-0,6));$
26. $\sin(\text{arctg}0,5), \cos\left(\arcsin\left(-\frac{12}{13}\right)\right);$
27. $\text{tg}\left(\arccos\left(-\frac{3}{5}\right)\right), \cos\left(\text{arcctg} \frac{1}{2}\right);$
28. $\text{ctg}\left(\arccos\left(-\frac{5}{13}\right)\right), \sin(\text{arctg}3);$
29. $\cos(\text{arcctg}(-5)), \text{tg}\left(\arcsin \frac{12}{13}\right);$
30. $\sin(\arccos 0,8), \cos(\text{arctg}(-4)).$