

ТИПОВОЙ РАСЧЕТ
«Элементарная математика»

Задание 1. Сократить дробь.

1.1. $\frac{3x^2 + 5x - 2}{4x^2 + 11x + 6}$.

1.2. $\frac{7x^2 - 2x - 5}{2x^2 - x - 1}$.

1.3. $\frac{3x^2 + 4x + 1}{3x^2 + x - 2}$.

1.4. $\frac{x^2 + 3x - 10}{2x^2 + 11x + 5}$.

1.5. $\frac{2x^2 - 5x - 3}{3x^2 - 10x + 3}$.

1.6. $\frac{2x^2 - 3x + 1}{x^2 + 5x - 6}$.

1.7. $\frac{-2x^2 + 7x - 3}{2x - 1}$.

1.8. $\frac{5 - x}{3x^2 - 13x - 10}$.

1.9. $\frac{4x^2 + 9x + 5}{2x^2 + 5x + 3}$.

1.10. $\frac{4x^2 + 7x + 3}{5x^2 + 11x + 6}$.

1.11. $\frac{3x^2 + 7x + 4}{6x^2 + 11x + 5}$.

1.12. $\frac{2x^2 + 3x - 1}{6x^2 + 7x + 1}$.

1.16. $\frac{5x^2 + 7x + 2}{5x^2 + 6x + 1}$.

1.17. $\frac{2x^2 + x - 3}{-4x^2 - 4x + 3}$.

1.18. $\frac{9x^2 + 3x - 2}{-6x^2 - x + 2}$.

1.19. $\frac{5x^2 + 6x + 1}{-5x^2 + 4x + 1}$.

1.20. $\frac{6x^2 + 7x + 1}{12x^2 + 8x + 1}$.

1.21. $\frac{-2x^2 + x + 1}{6x^2 - 5x - 1}$.

1.22. $\frac{4x^2 - x - 5}{5x^2 + 9x + 4}$.

1.23. $\frac{2x^2 + x - 1}{2x^2 + 3x + 1}$.

1.24. $\frac{5x^2 + 3x - 2}{7x^2 + 8x + 1}$.

1.25. $\frac{6x^2 + 7x + 2}{9x^2 + 3x - 2}$.

1.26. $\frac{5x^2 + 8x + 3}{6x^2 + 7x + 1}$.

1.27. $\frac{2x^2 + 3x + 1}{5x^2 + 9x + 4}$.

$$1.13. \frac{3x^2 + 4x - 4}{-x^2 + 4x + 12}.$$

$$1.28. \frac{3x^2 - 2x - 1}{3x^2 + 4x + 1}.$$

$$1.14. \frac{8x^2 + 6x + 1}{2x^2 + 3x + 1}.$$

$$1.29. \frac{4x^2 + 5x + 1}{7x^2 + 9x + 2}.$$

$$1.15. \frac{2x^2 + x - 3}{3x^2 + 2x - 5}.$$

$$1.30. \frac{2x^2 + 5x + 2}{4x^2 + 11x + 6}.$$

Задание 2. Выделить полный квадрат.

$$2.1. \text{ а) } x^2 + 12x - 4;$$

$$\text{б) } 4x^2 + 4x + 3.$$

$$2.2. \text{ а) } x^2 + 6x + 13;$$

$$\text{б) } x^2 + 3x - 1.$$

$$2.3. \text{ а) } x^2 + 20x - 14;$$

$$\text{б) } 2x^2 - 12x + 3.$$

$$2.4. \text{ а) } x^2 + 2x + 7;$$

$$\text{б) } x^2 - x + 5.$$

$$2.5. \text{ а) } x^2 - 16x + 36;$$

$$\text{б) } 3x^2 + 12x - 7.$$

$$2.6. \text{ а) } x^2 + 4x + 1;$$

$$\text{б) } x^2 - 3x + 1.$$

$$2.7. \text{ а) } x^2 - 1x + 19;$$

$$\text{б) } 2x^2 + 12x - 7.$$

$$2.8. \text{ а) } x^2 - 16x + 70;$$

$$\text{б) } x^2 - 3x + 2.$$

$$2.9. \text{ а) } x^2 + 20x - 2;$$

$$\text{б) } 5x^2 - 30x + 2.$$

$$2.10. \text{ а) } x^2 + 2x + 12;$$

$$\text{б) } x^2 + x + 2.$$

$$2.11. \text{ а) } x^2 + 6x + 4;$$

$$\text{б) } 4x^2 - 4x + 5.$$

$$2.12. \text{ а) } x^2 - 14x + 36;$$

$$\text{б) } x^2 - 5x + 1.$$

$$2.13. \text{ а) } x^2 - 18x + 45;$$

$$\text{б) } 3x^2 - 12x + 2.$$

$$2.14. \text{ а) } x^2 + 12x + 16;$$

$$\text{б) } x^2 - x + 4.$$

$$2.15. \text{ а) } x^2 - 2x - 4;$$

$$\text{б) } 4x^2 + 8x + 7.$$

$$2.16. \text{ а) } x^2 - 6x + 2;$$

$$\text{б) } x^2 + 5x + 1.$$

$$2.17. \text{ а) } x^2 + 8x + 14;$$

$$\text{б) } 5x^2 + 30x - 1.$$

$$2.18. \text{ а) } x^2 - 20x + 51;$$

$$\text{б) } x^2 + x + 1.$$

$$2.19. \text{ а) } x^2 + 4x + 16;$$

$$\text{б) } 2x^2 - 18x + 25.$$

2.20. а) $x^2 + 14x + 39$;

б) $x^2 - 3x + 7$.

2.21. а) $x^2 - 18x - 12$;

б) $4x^2 - 8x + 3$.

2.22. а) $x^2 + 16x + 40$;

б) $x^2 + x - 4$.

2.23. а) $x^2 + 10x - 2$;

б) $2x^2 - 4x + 5$.

2.24. а) $x^2 - 8x + 19$;

б) $x^2 - x - 4$.

2.25. а) $x^2 + 4x - 7$;

б) $9x^2 + 36x + 10$.

2.26. а) $x^2 + 18x + 30$;

б) $x^2 + 5x - 7$.

2.27. а) $x^2 - 12x + 37$;

б) $2x^2 - 8x + 1$.

2.28. а) $x^2 + 14x + 9$;

б) $x^2 - 3x + 10$.

2.29. а) $x^2 + 10x + 33$;

б) $3x^2 - 12x + 5$.

2.30. а) $x^2 - 8x - 1$;

б) $x^2 + 3x - 8$.

Задание 3. Выполнить деление многочлена $P_n(x)$ на $Q_m(x)$.

	$P_n(x)$	$Q_m(x)$
3.1	$2x^7 - x^5 + 6x^4 - 4x^3 - 3x^2 + 2x$	$x^5 + 3x^2 - 2x$
3.2	$3x^5 + 5x^4 - 6x^2 + 5x + 25$	$x^4 - 2x + 5$
3.3	$x^5 - x^4 + 3x^3 - 9x + 6$	$x^4 + 3x - 6$
3.4	$6x^6 + 4x^5 + 3x^4 + 2x^3 - 6x - 4$	$2x^5 + x^3 - 2$
3.5	$2x^7 + 4x^5 + 2x^4 - 7x^3 - 14x - 7$	$x^3 + 2x - 1$
3.6	$6x^6 + 27x^4 + 4x^3 - 10x^2 + 18x + 45$	$2x^2 + 9$
3.7	$9x^7 - 3x^5 - 14x^3 - 4x$	$3x^3 + x$

3.8	$x^6 + 3x^5 - 7x^3 - 21x^2 + 8x + 24$	$x^5 - 7x^2 + 8$
3.9	$5x^9 - 10x^8 + 20x^6 - 2x^3 + 4x^2 - 8$	$x^3 - 2x^2 + 4$
3.10	$8x^9 - 26x^7 - 7x^5 + 6x^4 - 21x^2$	$2x^4 - 7x^2$
3.11	$3x^5 + 2x^4 + x^3 - 21x^2 - 3x + 5$	$x^3 + x^2 - 7$
3.12	$3x^7 - x^6 - 6x^4 + 4x^3 + 6x^2 - 3$	$x^5 - 2x^2 + 2$
3.13	$2x^7 - x^6 + 2x^5 + x^4 + 3x^2$	$x^5 - 3x$
3.14	$x^7 + x^6 - 3x^5 + x^4 + 3x^3 - 3x$	$x^2 + x - 3$
3.15	$x^8 + x^7 - x^5 - 2x^4 + 3x^3 - 3x$	$x^3 + x^2 - 1$
3.16	$4x^5 - 7x^3 + 7x^2 + 6x - 10$	$x^3 - x + 2$
3.17	$4x^6 - 3x^4 + 8x^3 - 5x^2 - 3x - 1$	$x^4 + 2x - 1$
3.18	$4x^5 - 15x^3 + 19x^2 + 12x - 19$	$x^3 - 3x + 5$
3.19	$8x^6 - 6x^4 + 4x^3 - 5x^2 - 1$	$2x^4 + x - 1$
3.20	$8x^5 - 4x^4 - 6x^3 + 10x^2 + 3x - 10$	$2x^3 - x^2 + 2$
3.21	$3x^6 + 4x^4 - 12x^3 - 2x^2 + 3$	$x^3 + 2x - 4$
3.22	$3x^7 - 2x^5 - 3x^4 + 15x^3 + 4x^2 - 18x + 3$	$x^4 - x + 5$
3.23	$3x^8 - 2x^6 - 6x^4 + 9x^3 - 2x^6 - 14x + 3$	$x^5 - 2x + 3$

3.24	$6x^5 - 3x^4 + 11x^3 + 4x^2 - 18x + 3$	$2x^2 - x + 5$
3.25	$9x^6 - 6x^3 - 2x^2 - 4x + 3$	$3x^3 + 2x - 2$
3.26	$6x^6 + 3x^5 - 21x^4 - x^2 + 8x$	$3x^4 - x$
3.27	$4x^7 + 2x^6 - 14x^5 + 2x^4 - 5x^2$	$5x^5 + x^2$
3.28	$2x^7 + x^6 - 7x^5 + 6x^4 + 2x^3 - 15x^2$	$x^5 + 3x^2$
3.29	$6x^6 + 3x^5 - 21x^4 - 4x^3 + 13x + 7$	$3x^4 - 2x$
3.30	$10x^5 + 7x^4 - 35x^3 + 5x^2 - 4$	$5x^3 + x^2$

Задание 4. Решить неравенство.

4.1. $|3x^2 + 5x - 1| \leq 1$. 4.16. $|5x^2 + 6x + 7| > 6$.

4.2. $|7x^2 + 2x - 3| > 2$. 4.17. $|-4x^2 - 4x + 5| < 2$.

4.3. $|2x^2 - x + 3| \geq 4$. 4.18. $|9x^2 + 3x + 4| \leq 6$.

4.4. $|x^2 + 3x - 1| < 9$. 4.19. $|5x^2 + 6x + 5| \geq 4$.

4.5. $|3x^2 - 10x + 4| > 1$. 4.20. $|6x^2 + 7x + 9| > 8$.

4.6. $|2x^2 - 3x + 6| \leq 5$. 4.21. $|-2x^2 + x + 7| < 6$.

4.7. $|-2x^2 + 7x + 1| \geq 4$. 4.22. $|4x^2 - x - 3| \geq 2$.

4.8. $|3x^2 - 13x - 8| < 2$. 4.23. $|6x^2 - 5x + 3| \leq 4$.

4.9. $|4x^2 + 9x + 6| < 1$. 4.24. $|5x^2 + 3x + 2| > 4$.

4.10. $|5x^2 + 11x + 9| \geq 3$. 4.25. $|9x^2 + 3x + 5| < 7$.

4.11. $|3x^2 + 7x + 8| \leq 4$. 4.26. $|7x^2 + 8x + 7| \geq 6$.

$$4.12. \quad |6x^2 + 7x + 6| > 5.$$

$$4.27. \quad |2x^2 + 3x + 4| \leq 3.$$

$$4.13. \quad |-x^2 + 4x + 14| < 2.$$

$$4.28. \quad |-3x^2 + 2x + 6| < 5.$$

$$4.14. \quad |2x^2 + 3x + 5| \geq 4.$$

$$4.29. \quad |4x^2 + 5x + 7| > 6.$$

$$4.15. \quad |3x^2 + 2x - 2| \leq 3.$$

$$4.30. \quad |-2x^2 + 5x + 7| \geq 4.$$

Задание 5. Построить график функции.

$$5.1. f(x) = \begin{cases} -x, & x \leq 0 \\ x^2, & 0 < x \leq 1 \\ \ln x + 1, & x > 1 \end{cases}$$

$$5.16. f(x) = \begin{cases} -3x, & x \leq 1 \\ x^2 - 4, & 1 < x < 3 \\ \frac{3}{x}, & x \geq 3 \end{cases}$$

$$5.2. f(x) = \begin{cases} -x^2, & x \leq 0 \\ \sin x, & 0 < x < \frac{\pi}{2} \\ 1, & x > \frac{\pi}{2} \end{cases}$$

$$5.17. f(x) = \begin{cases} 2x + 1, & x < -1 \\ x^2, & -1 \leq x < 2 \\ \frac{-2}{x}, & x > 2 \end{cases}$$

$$5.3. f(x) = \begin{cases} 2x^2, & x \leq 0 \\ \ln x, & 0 < x \leq 1 \\ \frac{1}{x}, & x > 1 \end{cases}$$

$$5.18. f(x) = \begin{cases} -x, & x < 0 \\ \sin x, & 0 \leq x < \pi \\ x - \pi, & x \geq \pi \end{cases}$$

$$5.4. f(x) = \begin{cases} -\frac{4}{x}, & x \leq -4 \\ x + 5, & -4 < x < 1 \\ 4^x, & x \geq 1 \end{cases}$$

$$5.19. f(x) = \begin{cases} x + 1, & x \leq 0 \\ \cos x, & 0 < x < \frac{\pi}{2} \\ \frac{\pi}{2} - x, & x \geq \frac{\pi}{2} \end{cases}$$

$$5.5. f(x) = \begin{cases} -2x, & x < -1 \\ x^2 + 1, & -1 \leq x < 2 \\ 2^x, & x \geq 2 \end{cases}$$

$$5.20. f(x) = \begin{cases} x + 1, & x \leq 0 \\ \ln x, & 0 < x \leq 1 \\ e^x, & x > 1 \end{cases}$$

$$5.6. f(x) = \begin{cases} x + 2, & x < -2 \\ 4 - x^2, & -2 \leq x \leq 1 \\ \frac{3}{x}, & x \geq 2 \end{cases}$$

$$5.21. f(x) = \begin{cases} -x, & x \leq 0 \\ x, & 0 < x \leq 1 \\ \log_2 x, & x > 1 \end{cases}$$

$$5.7. f(x) = \begin{cases} -3 - x, & x < -2 \\ x^2 - 5, & -2 \leq x \leq 2 \\ \frac{2}{x}, & x > 2 \end{cases}$$

$$5.22. f(x) = \begin{cases} x, & x \leq 1 \\ \frac{1}{x}, & 1 < x \leq 2 \\ 0,5, & x > 2 \end{cases}$$

$$5.8. f(x) = \begin{cases} 2x, & x < 0 \\ \sin x, & 0 \leq x \leq \pi \\ \pi - x, & x > \pi \end{cases}$$

$$5.23. f(x) = \begin{cases} x^2, & x \leq 1 \\ \ln x, & 1 < x \leq e \\ 2, & x > e \end{cases}$$

$$5.9. f(x) = \begin{cases} x^2 + 1, & x \leq 0 \\ \cos x, & 0 < x < \pi \\ -2, & x > \pi \end{cases}$$

$$5.24. f(x) = \begin{cases} -x, & x \leq 0 \\ \operatorname{tg} x, & 0 < x < \frac{\pi}{4} \\ 1, & x \geq \frac{\pi}{4} \end{cases}$$

$$5.10. f(x) = \begin{cases} x^2 + 2, & x \leq 0 \\ e^x, & 0 < x < 2 \\ x - 3, & x \geq 2 \end{cases}$$

$$5.25. f(x) = \begin{cases} x + 2, & x \leq -1 \\ x^2, & -1 < x \leq 1 \\ \frac{-2}{x}, & x > 1 \end{cases}$$

$$5.11. f(x) = \begin{cases} x + 2, & x \leq -2 \\ x^2 + 4, & -2 < x \leq 2 \\ -3, & x > 2 \end{cases}$$

$$5.26. f(x) = \begin{cases} -x^2 + 1, & x \leq 0 \\ \cos x, & 0 < x \leq \frac{\pi}{2} \\ x - \frac{\pi}{2}, & x > \frac{\pi}{2} \end{cases}$$

$$5.12. f(x) = \begin{cases} -x - 1, & x \leq 0 \\ x^2 - 1, & 0 < x \leq 2 \\ 4, & x > 2 \end{cases}$$

$$5.27. f(x) = \begin{cases} 2^x, & x \leq 0 \\ x, & 0 < x \leq 2 \\ 2, & x > 2 \end{cases}$$

$$5.13. f(x) = \begin{cases} 2^{-x}, & x \leq 0 \\ x + 1, & 0 < x \leq 4 \\ 5, & x > 4 \end{cases}$$

$$5.28. f(x) = \begin{cases} \ln(-x), & x < 0 \\ \sin x, & 0 \leq x \leq \pi \\ x - \frac{\pi}{2}, & x > \pi \end{cases}$$

$$5.14. f(x) = \begin{cases} 2^x, & x \leq -1 \\ x, & -1 < x \leq 3 \\ -3, & x > 3 \end{cases}$$

$$5.29. f(x) = \begin{cases} x^3, & x \leq 0 \\ x, & 0 < x \leq 1 \\ \frac{1}{x}, & x > 1 \end{cases}$$

$$5.15. f(x) = \begin{cases} -x^2, & x \leq 0 \\ \sin x, & 0 < x \leq \frac{\pi}{2} \\ 1, & x \geq \frac{\pi}{2} \end{cases}$$

$$5.30. f(x) = \begin{cases} \left(\frac{1}{2}\right)^x, & x \leq 0 \\ x + \frac{1}{2}, & 0 < x \leq 2 \\ 2, & x > 2 \end{cases}$$

Задание 6. Найти частное двух комплексных чисел. Полученное число представить в тригонометрической и показательной формах записи и изобразить на комплексной плоскости.

$$6.1. z = \frac{i}{i+1}.$$

$$6.16. z = \frac{1-i\sqrt{3}}{i}.$$

$$6.2. z = \frac{1+i\sqrt{3}}{1-i\sqrt{3}}.$$

$$6.17. z = \frac{6}{1+i}.$$

$$6.3. z = \frac{2i}{i-\sqrt{3}}.$$

$$6.18. z = \frac{1-i\sqrt{3}}{3i}.$$

$$6.4. z = \frac{\sqrt{3}-i}{\sqrt{3}+i}.$$

$$6.19. z = \frac{7}{\sqrt{2}+i\sqrt{6}}.$$

$$6.5. z = \frac{-1+i}{i}.$$

$$6.20. z = \frac{3i}{\sqrt{3}+i}.$$

$$6.6. z = \frac{3-i\sqrt{3}}{5i}.$$

$$6.21. z = \frac{-\sqrt{5}+i\sqrt{5}}{-6i}.$$

$$6.7. z = \frac{13}{\sqrt{6}-i\sqrt{2}}.$$

$$6.22. z = \frac{\frac{1}{2}+i}{3+i}.$$

$$6.8. z = \frac{5i}{1-i}.$$

$$6.23. z = \frac{7+i7}{-3i}.$$

$$6.9. z = \frac{-\sqrt{3}+i}{-\sqrt{3}-i}.$$

$$6.24. z = \frac{11}{-2\sqrt{3}+i2}.$$

$$6.10. z = \frac{3+i}{-2+i}.$$

$$6.11. z = \frac{\sqrt{3}+3i}{-4i}.$$

$$6.12. z = \frac{-5}{\sqrt{11}-i\sqrt{11}}.$$

$$6.13. z = \frac{-i}{\sqrt{3}i+1}.$$

$$6.14. z = \frac{3}{-\sqrt{13}+i\sqrt{13}}.$$

$$6.15. z = \frac{2\sqrt{2}-i2\sqrt{2}}{3i}.$$

$$6.25. z = \frac{2i}{\sqrt{3}i-1}.$$

$$6.26. z = \frac{-1-i\sqrt{3}}{-1+i\sqrt{3}}.$$

$$6.27. z = \frac{-3-i}{2-i}.$$

$$6.28. z = \frac{2\sqrt{3}-i}{5i}.$$

$$6.29. z = \frac{-2i}{\sqrt{3}-i}.$$

$$6.30. z = \frac{4i}{1-i\sqrt{3}}.$$

Задание 7. Вычислить двумя способами:

- 1) по формуле Муавра;
- 2) в алгебраической форме.

$$7.1. (-\sqrt{3}+i)^5.$$

$$7.16. \left(\frac{1}{2}-i\frac{\sqrt{3}}{2}\right)^4.$$

$$7.2. (-2-i2\sqrt{3})^3.$$

$$7.17. (-1+i\sqrt{3})^6.$$

$$7.3. (\sqrt{5}-i\sqrt{5})^4.$$

$$7.18. \left(-\frac{1}{2}+i\frac{\sqrt{3}}{2}\right)^5.$$

$$7.4. (-\sqrt{11}+i\sqrt{11})^6.$$

$$7.19. (2\sqrt{3}-2i)^3.$$

$$7.5. (1+i)^7.$$

$$7.20. (1-i\sqrt{3})^5.$$

$$7.6. \left(-\frac{\sqrt{3}}{2}-i\frac{1}{2}\right)^4.$$

$$7.21. (-\sqrt{7}+i\sqrt{21})^3.$$

$$7.7. (\sqrt{15}-i\sqrt{5})^6.$$

$$7.22. (-8+8\sqrt{3}i)^5.$$

7.8. $(\sqrt{2} - i\sqrt{2})^6$.

7.9. $\left(\frac{\sqrt{3}}{5} - \frac{i}{5}\right)^3$.

7.10. $\left(-\frac{\sqrt{3}}{4} - \frac{i}{4}\right)^4$.

7.11. $(-\sqrt{6}i - \sqrt{6})^4$.

7.12. $(-\sqrt{2}i + \sqrt{2})^6$.

7.13. $(\sqrt{12} + i\sqrt{12})^5$.

7.14. $\left(\frac{\sqrt{3}}{3} - \frac{i}{3}\right)^4$.

7.15. $(-\sqrt{3} + i3)^5$.

7.23. $(-3 + i\sqrt{3})^4$.

7.24. $(\sqrt{3} - i\sqrt{3})^7$.

7.25. $\left(-\frac{2}{3}i + \frac{2}{3}\right)^5$.

7.26. $\left(-\frac{1}{7} + \frac{i\sqrt{3}}{7}\right)^3$.

7.27. $(-5\sqrt{3} - 5i)^4$.

7.28. $(2 - i2\sqrt{3})^3$.

7.29. $(-i + 1)^7$.

7.30. $(-\sqrt{5} - \sqrt{5}i)^6$.

Задание 8. Найти все значения корня и изобразить их на комплексной плоскости.

8.1. $\sqrt[3]{8}$.

8.2. $\sqrt[4]{-\frac{1}{16}}$.

8.3. $\sqrt[4]{-1}$.

8.4. $\sqrt[3]{-\frac{1}{8}}$.

8.5. $\sqrt[4]{2 - i2}$.

8.6. $\sqrt[4]{-27}$.

8.7. $\sqrt[4]{-16}$.

8.16. $\sqrt[4]{\frac{-1 - i\sqrt{3}}{2}}$.

8.17. $\sqrt[3]{\frac{i}{27}}$.

8.18. $\sqrt[5]{-i}$.

8.19. $\sqrt[3]{-i \cdot 27}$.

8.20. $\sqrt[3]{-2 - i2\sqrt{3}}$.

8.21. $\sqrt[5]{-32i}$.

8.22. $\sqrt[5]{i}$.

$$8.8. \sqrt[4]{-\frac{1}{81}}.$$

$$8.9. \sqrt[4]{-\frac{1}{2} + i\frac{\sqrt{3}}{2}}.$$

$$8.10. \sqrt[4]{-128 + i128\sqrt{3}}.$$

$$8.11. \sqrt[5]{-32i}.$$

$$8.12. \sqrt[3]{-\frac{i}{125}}.$$

$$8.13. \sqrt[5]{-32 + i32}.$$

$$8.14. \sqrt[5]{-1 + i}.$$

$$8.15. \sqrt[4]{-\frac{1}{32} + i\frac{\sqrt{3}}{32}}.$$

$$8.23. \sqrt[3]{3 - i\sqrt{3}}.$$

$$8.24. \sqrt[4]{-81 + i81\sqrt{3}}.$$

$$8.25. \sqrt[4]{8 - i8\sqrt{3}}.$$

$$8.26. \sqrt[4]{1}.$$

$$8.27. \sqrt[4]{-\frac{1}{2} + i\frac{\sqrt{3}}{2}}.$$

$$8.28. \sqrt[4]{-8 + i8\sqrt{3}}.$$

$$8.29. \sqrt[5]{4\sqrt{2} - i4\sqrt{2}}.$$

$$8.30. \sqrt[4]{-128 - i128\sqrt{3}}.$$

Задание 9. Решить уравнения, выполнить проверку.

$$9.1. z^2 + (3i - 2)z + 5 - 3i = 0.$$

$$9.2. z^2 - (2i - 5)z + 5 - 5i = 0.$$

$$9.3. z^2 - (1 + 3i)z - 1 + \frac{3}{2}i = 0.$$

$$9.4. z^2 + (3i - 2)z + 1 - 3i = 0.$$

$$9.5. iz^2 + (1 + i)z + 4i + \frac{1}{2} = 0.$$

$$9.6. z^2 + (1 - i)z - \frac{1}{2}i + 4 = 0.$$

$$9.7. z^2 - (2 + i)z + \frac{3}{4} + i = 0.$$

$$9.8. -iz^2 + (2 - i)z + 1 + 3i = 0.$$

$$9.9. z^2 + (2i+1)z + \left(i + \frac{3}{2}\right) = 0.$$

$$9.10. z^2 - \left(\frac{1}{2}i - 2\right)z + \left(-\frac{1}{2}i - \frac{1}{16}\right) = 0.$$

$$9.11. 2iz^2 + (i-3)z + \left(i - \frac{3}{4}\right) = 0.$$

$$9.12. -\frac{1}{4}z^2 + (1-3i)z + (6i-1) = 0.$$

$$9.13. z^2 + (6-i)z + \left(-3i - \frac{1}{4}\right) = 0.$$

$$9.14. z^2 - (4i+1)z + \left(2i - \frac{3}{2}\right) = 0.$$

$$9.15. -iz^2 + \left(2i - \frac{1}{2}\right)z + \left(\frac{1}{16}i + \frac{1}{2}\right) = 0.$$

$$9.16. \left(-6 + \frac{5}{2}i\right)z^2 + (5i+1)z + 1 = 0.$$

$$9.17. \frac{1}{4}z^2 + (5i-1)z + (-10i-23) = 0.$$

$$9.18. z^2 + (2+3i)z + 3i = 0.$$

$$9.19. z^2 + (2i+1)z + (i-1) = 0.$$

$$9.20. (-i-1)z^2 + (2i-1)z + 1 = 0.$$

$$9.21. \left(1 + \frac{1}{4}i\right)z^2 + (3i-1)z - 6 = 0.$$

$$9.22. (2-i)z^2 + (i-1)z + \frac{1}{2} = 0.$$

$$9.23. (2-3i)z^2 + (2i-3)z + 1 = 0.$$

$$9.24. z^2 + (2i+3)z + (1+3i) = 0.$$

$$9.25. (2i+1)z^2 + (4i-3)z - 3 = 0.$$

$$9.26. z^2 + (3i + 4)z + (6i + 1) = 0.$$

$$9.27. (i - 1)z^2 + (2i - 5)z - 5 = 0.$$

$$9.28. (i - 3)z^2 + (2i - 4)z - 1 = 0.$$

$$9.29. \frac{5}{2}z^2 + (i - 5)z + (1 - i) = 0.$$

$$9.30. z^2 + (i - 2)z + (4 - i) = 0.$$

Задание 10. Изобразить заданную область.

$$10.1. |z - 1| \leq 1, |z + 1| > 2.$$

$$10.2. |z - 1 - i| \geq 1, 0 \leq \operatorname{Re} z < 2, 0 < \operatorname{Im} z \leq 2.$$

$$10.3. |z - 1 - i| < 1, |\arg z| \leq \frac{\pi}{4}.$$

$$10.4. |z| \leq 1, \arg(z + i) > \frac{\pi}{4}.$$

$$10.5. |z + i| \leq 3, |z - i| > 3.$$

$$10.6. |z + i| \geq 1, |z| \leq 2.$$

$$10.7. |z + i| < 2, 0 < \operatorname{Re} z \leq 1.$$

$$10.8. 1 \leq |z - 1| \leq 2, \operatorname{Im} z \geq 0, \operatorname{Re} z < 1.$$

$$10.9. 1 \leq |z - i| < 2, \operatorname{Re} z \leq 0, \operatorname{Im} z > 1.$$

$$10.10. |z| < 2, \operatorname{Re} z \geq 1, \arg z < \frac{\pi}{4}.$$

$$10.11. |z| > 1, -1 < \operatorname{Im} z \leq 1, 0 < \operatorname{Re} z \leq 2.$$

$$10.12. |z - 1| > 1, -1 \leq \operatorname{Im} z < 0, 0 \leq \operatorname{Re} z < 3.$$

$$10.13. |z + i| < 1, -\frac{3\pi}{4} \leq \arg z \leq -\frac{\pi}{4}.$$

$$10.14. |z - i| \leq 1, -\frac{\pi}{2} < \arg(z - i) < \frac{\pi}{4}.$$

$$10.15. |z + 1| \geq 1, |z + i| < 1.$$

- 10.16. $|z+i| \geq 1, |z| \leq 3.$
- 10.17. $|z-1+i| \geq 1, \operatorname{Re} z < 1, \operatorname{Im} z \leq -1.$
- 10.18. $|z-1-i| \leq 1, \operatorname{Im} z > 1, \operatorname{Re} z \geq 1.$
- 10.19. $|z-i| \leq 2, \operatorname{Re} z > 1.$
- 10.20. $|z+i| \leq 2, |z-i| > 2.$
- 10.21. $|z-2-i| \leq 2, \operatorname{Re} z \geq 3, \operatorname{Im} z < 1.$
- 10.22. $|\operatorname{Re} z| \leq 1, |\operatorname{Im} z| < 2.$
- 10.23. $|z-2-i| \geq 1, 1 \leq \operatorname{Re} z < 3, 0 < \operatorname{Im} z \leq 3.$
- 10.24. $|z-i| < 1, |\arg z| \geq \frac{\pi}{4}.$
- 10.25. $|z-1| < 1, \arg z \leq \frac{\pi}{4}, \arg(z-1) > \frac{\pi}{4}.$
- 10.26. $1 < z \cdot \bar{z} < 2, \operatorname{Re} z > 0, 0 \leq \operatorname{Im} z \leq 1.$
- 10.27. $z \cdot \bar{z} \leq 2, \operatorname{Re} z < 1, \operatorname{Im} z > -1.$
- 10.28. $z \cdot \bar{z} < 2, \operatorname{Re} z \leq 1, \operatorname{Im} z > -1.$
- 10.29. $|z| > 2, -2 < \operatorname{Im} z \leq 2, 0 < \operatorname{Re} z \leq 3.$
- 10.30. $|z-3i| \geq 1, 0 < \operatorname{Im} z \leq 3, -1 < \operatorname{Re} z < 1.$