

Ответы к самостоятельной работе ...

- 1) 1 круг $\left|w - \frac{1}{8}\right| = \frac{1}{8}$
 2 $u > 0, \left|w - \frac{1}{10}\right| > \frac{1}{10}$ 3 область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{8}\right)^2 + v^2 = \frac{1}{64}, \left(u - \frac{1}{8}\right)^2 + v^2 = \frac{1}{64}$
 4 $w = \frac{-4i(z+8)}{z-10i-2}$ 5 $w = \frac{1-i}{2}(z+1)$
 6 $w = \frac{3z(1+i)+9-9i}{z(1-i)+3-3i}$, круг $|w| < 3$
 7 $w = \frac{7z-1}{7-z}$ 8 $|w| < 1$
- 2) 1 $v = -6$ 2 $\frac{1}{16} \leq u \leq \frac{1}{8}, v = 0$ 3 область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{18}\right)^2 + v^2 = \frac{1}{324}, \left(u - \frac{1}{18}\right)^2 + v^2 = \frac{1}{324}$
 4 $w = \frac{-2i(z+1)}{4z-5i-1}$ 5 $w = \frac{6iz+36i+72}{z+6}$
 6 $w = 3i \frac{z-3}{z-3i}$, в полуплоскость $\operatorname{Re} w + \operatorname{Im} w < 3$
 7 $w = i \frac{2z-1}{2-z}$ 8 $\operatorname{Re} w > 0$
- 3) 1 $\frac{1}{3}(u^2 + v^2) + u + v = 0$
 2 $|w| = \frac{1}{8}, -\pi < \arg w < -\frac{\pi}{8}$
 3 $(u+1)^2 + (v+2)^2 = \frac{14}{3}$ 4 $w = \frac{-6i(z+3)}{4z-15i-3}$
 5 $w = \frac{6z(i-1)+36(3i-1)}{z(i-1)+6i+6}$
 6 $w = \frac{5z-25}{z+5}$, в верхнюю полуплоскость $\operatorname{Im} w > 0$
 7 $w = \frac{5z-1}{5-z}$ 8 $\operatorname{Re} w > 0$
- 4) 1 $u = 8$ 2 $\arg w = -\frac{\pi}{6}$
 3 $(u+1)^2 + (v+2)^2 = \frac{19}{4}$
 4 $w = \frac{-2i(z+2)}{2z-5i-1}$ 5 $w = \frac{5iz+25i+50}{z+5}$
 6 $w = \frac{3z-9}{z+3}$, в верхнюю полуплоскость $\operatorname{Im} w > 0$
 7 $w = i \frac{z-7i}{z+7i}$ 8 $u < v$
- 5) 1 круг $|w| = 4$ 2 $\frac{1}{6} < v < \frac{1}{3}, u = 0$
 3 нижняя полуплоскость с выброшенным полукругом $u^2 + v^2 = \frac{1}{5}$ 4 $w = \frac{-2i(z+4)}{z-5i-1}$ 5 $w = \frac{1-i}{2}(z+3)$
 6 $w = \frac{2z-4}{z+2}$, в верхнюю полуплоскость $\operatorname{Im} w > 0$
 7 $w = i \frac{3z-1}{3-z}$ 8 $|w| < 1$
- 6) 1 круг $|w| = 3$ 2 $u > 0, \left|w - \frac{1}{6}\right| > \frac{1}{6}$
 3 область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{4}\right)^2 + v^2 = \frac{1}{16}, \left(u - \frac{1}{4}\right)^2 + v^2 = \frac{1}{16}$
 4 $w = \frac{-6i(z+6)}{2z-15i-3}$ 5 $w = \frac{1-i}{2}(z+4)$
 6 $w = \frac{4z-16}{z+4}$, в верхнюю полуплоскость $\operatorname{Im} w > 0$
 7 $w = \frac{8z-1}{8-z}$ 8 $|w| < 1$
- 7) 1 $v = -7$ 2 $|w| = \frac{1}{7}, -\pi < \arg w < -\frac{\pi}{7}$
 3 $(u+1)^2 + (v+2)^2 = \frac{44}{9}$
 4 $w = \frac{-10i(z+5)}{4z-25i-5}$ 5 $w = \frac{1-i}{2}(z+2)$
 6 $w = \frac{z(1+i)+1-i}{z(1-i)+1-i}$, круг $|w| < 1$
 7 $w = \frac{3z-1}{3-z}$ 8 $u < v$
- 8) 1 круг $|w| = 9$ 2 $\frac{1}{28} \leq u \leq \frac{1}{14}, v = 0$
 3 нижняя полуплоскость с выброшенным полукругом $u^2 + v^2 = \frac{1}{6}$ 4 $w = \frac{-18i(z+9)}{4z-45i-9}$
 5 $w = \frac{1z(i-1)+1(3i-1)}{z(i-1)+1i+1}$
 6 $w = \frac{z-1}{z+1}$, в верхнюю полуплоскость $\operatorname{Im} w > 0$
 7 $w = i \frac{8z-1}{8-z}$ 8 $\operatorname{Re} w > 0$

- 9) [1] круг $\left|w - \frac{1}{12}\right| = \frac{1}{12}$
 [2] $u > 0, \left|w - \frac{1}{8}\right| > \frac{1}{8}$ [3] область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{6}\right)^2 + v^2 = \frac{1}{36}, \left(u - \frac{1}{6}\right)^2 + v^2 = \frac{1}{36}$ [4] $w = \frac{-14i(z+7)}{4z-35i-7}$
 [5] $w = \frac{4z(i-1) + 16(3i-1)}{z(i-1) + 4i + 4}$
 [6] $w = \frac{8(1-i)(z-4i)}{z(1+i) - 12i + 4}$ [7] $w = \frac{2z-1}{2-z}$
 [8] $u < v$
- 10) [1] $\frac{1}{6}(u^2 + v^2) + u + v = 0$ [2] $\arg w = -\frac{\pi}{4}$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 + v^2 = \frac{1}{9}$ [4] $w = \frac{2(2i-z)}{2-zi}$ [5] $w = \frac{1-i}{2}(z+6)$
 [6] $w = \frac{16(1-i)(z-8i)}{z(1+i) - 24i + 8}$ [7] $w = i\frac{z-8i}{z+8i}$
 [8] $\operatorname{Re} w > 0$
- 11) [1] круг $|w| = 7$ [2] $\arg w = -\frac{\pi}{5}$
 [3] $(u+1)^2 + (v+2)^2 = \frac{34}{7}$
 [4] $w = \frac{3(3i-z)}{3-zi}$ [5] $w = \frac{3iz+9i+18}{z+3}$
 [6] $w = 2i\frac{z-2}{z-2i}$, в полуплоскость $\operatorname{Re} w + \operatorname{Im} w < 2$
 [7] $w = i\frac{5z-1}{5-z}$ [8] $u < v$
- 12) [1] окружность $u^2 + v^2 + 5v = 0$
 [2] $\arg w = -\frac{\pi}{7}$ [3] область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{12}\right)^2 + v^2 = \frac{1}{144}, \left(u - \frac{1}{12}\right)^2 + v^2 = \frac{1}{144}$
 [4] $w = \frac{9(9i-z)}{9-zi}$ [5] $w = \frac{1iz+1i+2}{z+1}$
 [6] $w = 4i\frac{z-4}{z-4i}$, в полуплоскость $\operatorname{Re} w + \operatorname{Im} w < 4$
 [7] $w = \frac{z-5i}{z+5i}$ [8] $\operatorname{Re} w > 0$
- 13) [1] $u = 5$ [2] $\frac{1}{32} \leq u \leq \frac{1}{16}, v = 0$ [3] область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{10}\right)^2 + v^2 = \frac{1}{100}, \left(u - \frac{1}{10}\right)^2 + v^2 = \frac{1}{100}$
 [4] $w = \frac{7(7i-z)}{7-zi}$ [5] $w = \frac{1-i}{2}(z+5)$
 [6] $w = 5i\frac{z-5}{z-5i}$, в полуплоскость $\operatorname{Re} w + \operatorname{Im} w < 5$
 [7] $w = \frac{z-7i}{z+7i}$ [8] $\operatorname{Re} w > 0$
- 14) [1] $u = 9$ [2] $\frac{1}{8} < v < \frac{1}{4}, u = 0$
 [3] $(u+1)^2 + (v+2)^2 = \frac{39}{8}$ [4] $w = \frac{4(4i-z)}{4-zi}$
 [5] $w = \frac{5z(i-1) + 25(3i-1)}{z(i-1) + 5i + 5}$
 [6] $w = i\frac{z-1}{z-i}$, в полуплоскость $\operatorname{Re} w + \operatorname{Im} w < 1$
 [7] $w = i\frac{7z-1}{7-z}$ [8] $u < v$
- 15) [1] $u^2 + \left(v + \frac{4}{3}\right)^2 = \frac{4}{9}$
 [2] $u > 0, \left|w - \frac{1}{12}\right| > \frac{1}{12}$ [3] область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{14}\right)^2 + v^2 = \frac{1}{196}, \left(u - \frac{1}{14}\right)^2 + v^2 = \frac{1}{196}$
 [4] $w = \frac{8(8i-z)}{8-zi}$ [5] $w = \frac{4iz+16i+32}{z+4}$
 [6] $w = \frac{4z(1+i) + 16 - 16i}{z(1-i) + 4 - 4i}$, круг $|w| < 4$
 [7] $w = i\frac{z-2i}{z+2i}$ [8] $u < v$
- 16) [1] $v = -4$ [2] $\frac{1}{12} < v < \frac{1}{6}, u = 0$ [3] область $v \leq 0$ с выброшенными полукругами $\left(u + \frac{1}{16}\right)^2 + v^2 = \frac{1}{256}, \left(u - \frac{1}{16}\right)^2 + v^2 = \frac{1}{256}$
 [4] $w = \frac{5(5i-z)}{5-zi}$ [5] $w = \frac{2iz+4i+8}{z+2}$
 [6] $w = \frac{5z(1+i) + 25 - 25i}{z(1-i) + 5 - 5i}$, круг $|w| < 5$
 [7] $w = i\frac{z-3i}{z+3i}$ [8] $|w| < 1$

17) [1] $v = -\frac{1}{6}u$ [2] $|w| = \frac{1}{3}, -\pi < \arg w < -\frac{\pi}{3}$
 [3] $(u+1)^2 + (v+2)^2 = \frac{9}{2}$ [4] $w = \frac{6(6i-z)}{6-zi}$
 [5] $w = \frac{2z(i-1) + 4(3i-1)}{z(i-1) + 2i + 2}$
 [6] $w = \frac{2z(1+i) + 4 - 4i}{z(1-i) + 2 - 2i}$, круг $|w| < 2$
 [7] $w = \frac{z-4i}{z+4i}$ [8] $\operatorname{Re} w > 0$

18) [1] круг $|w| = 5$ [2] $\arg w = -\frac{\pi}{8}$
 [3] $(u+1)^2 + (v+2)^2 = \frac{24}{5}$ [4] $w = \frac{1(1i-z)}{1-zi}$
 [5] $w = \frac{3z(i-1) + 9(3i-1)}{z(i-1) + 3i + 3}$
 [6] $w = \frac{20(1-i)(z-10i)}{z(1+i) - 30i + 10}$ [7] $w = i \frac{z-9i}{z+9i}$
 [8] $|w| < 1$

19) [1] $u = 4$ [2] $\frac{1}{4} < v < \frac{1}{2}, u = 0$
 [3] $(u+1)^2 + (v+2)^2 = \frac{29}{6}$ [6] $w = \frac{4(1-i)(z-2i)}{z(1+i) - 6i + 2}$
 [7] $w = i \frac{z-4i}{z+4i}$ [8] $u < v$

20) [1] окружность $u^2 + v^2 + 6v = 0$
 [2] $\frac{1}{24} \leq u \leq \frac{1}{12}, v = 0$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 +$
 $v^2 = \frac{1}{4}$ [6] $w = \frac{12(1-i)(z-6i)}{z(1+i) - 18i + 6}$ [7] $w = i \frac{9z-1}{9-z}$
 [8] $u < v$

21) [1] $v = -5$ [2] $\frac{1}{36} \leq u \leq \frac{1}{18}, v = 0$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 +$
 $v^2 = \frac{1}{2}$ [7] $w = i \frac{6z-1}{6-z}$ [8] $\operatorname{Re} w > 0$

22) [1] круг $|w| = 2$ [2] $u > 0, \left|w - \frac{1}{14}\right| > \frac{1}{14}$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 +$
 $v^2 = \frac{1}{3}$ [7] $w = \frac{z-8i}{z+8i}$ [8] $|w| < 1$

23) [1] $u^2 + \left(v + \frac{5}{4}\right)^2 = \frac{5}{16}$
 [2] $|w| = \frac{1}{4}, -\pi < \arg w < -\frac{\pi}{4}$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 +$
 $v^2 = \frac{1}{7}$ [7] $w = \frac{4z-1}{4-z}$ [8] $|w| < 1$

24) [1] $\frac{1}{8}(u^2 + v^2) + u + v = 0$
 [2] $|w| = \frac{1}{5}, -\pi < \arg w < -\frac{\pi}{5}$
 [3] нижняя полуплоскость с выброшенным полукругом $u^2 +$
 $v^2 = \frac{1}{8}$ [7] $w = \frac{z-9i}{z+9i}$ [8] $|w| < 1$

25) [1] $u = 7$ [2] $\arg w = -\frac{\pi}{9}$ [7] $w = i \frac{4z-1}{4-z}$

26) [1] круг $\left|w - \frac{1}{10}\right| = \frac{1}{10}$ [2] $\frac{1}{10} < v < \frac{1}{5}, u = 0$
 [7] $w = i \frac{z-5i}{z+5i}$

27) [1] окружность $u^2 + v^2 + 7v = 0$
 [2] $\frac{1}{14} < v < \frac{1}{7}, u = 0$ [7] $w = \frac{z-3i}{z+3i}$

28) [1] круг $\left|w - \frac{1}{14}\right| = \frac{1}{14}$ [2] $\arg w = -\frac{\pi}{2}$
 [7] $w = i \frac{z-6i}{z+6i}$

29) [1] $v = -9$ [2] $|w| = \frac{1}{9}, -\pi < \arg w < -\frac{\pi}{9}$
 [7] $w = \frac{9z-1}{9-z}$

30) [1] окружность $u^2 + v^2 + 8v = 0$
 [2] $|w| = \frac{1}{2}, -\pi < \arg w < -\frac{\pi}{2}$ [7] $w = \frac{6z-1}{6-z}$