

2. domaća zadaća iz Kompleksne analize

Odredi sliku područja G pri preslikavanju $w = S(z)$:

1. A) $G = \{|z - 1| < 2\}$, $w = \frac{2z}{z + 3}$
B) $G = \{0 < \operatorname{Re} z < 1\}$, $w = \frac{z - 1}{z}$
2. A) $G = \{|z - 1| < 2\}$, $w = \frac{z + 1}{z - 2}$
B) $G = \{\operatorname{Re} z > 0, \operatorname{Im} z > 0\}$, $w = \frac{1 - z}{1 + z}$
3. A) $G = \{\operatorname{Re} z < 1\}$, $w = \frac{z}{z - 2}$
B) $G = \{|\operatorname{Re} z| + |\operatorname{Im} z| < 1, \operatorname{Im} z > 0\}$, $w = \frac{z + i}{z - i}$
4. A) $G = \{|z| < 1, \operatorname{Im} z > 0\}$, $w = \frac{z - 1}{z + 1}$
B) $G = \{1 < |z| < 2\}$, $w = \frac{2}{z - 1}$
5. A) $G = \{\operatorname{Im} z > 0\}$, $w = \frac{i - z}{i + z}$
B) $G = \{|z - \frac{1}{2}| < \frac{1}{2}, \operatorname{Im} z > 0\}$, $w = \frac{z}{z - 1}$

Odredi Möbiusovu transformaciju koja preslikava točke $0, i, \infty$ redom u točke:

6. A) $-1, 0, 1$
B) $-2i, -2, 2i$

Odredi Möbiusovu transformaciju koja preslikava točke $0, 1 + i, 2$ redom u točke:

7. A) $0, 2 + 2i, 4$
B) $0, 2, \infty$

Odredi Möbiusovu transformaciju koja preslikava područje G u G^* :

8. A) $G = \{|z| < 1\}$, $G^* = \{\operatorname{Im} w < 0\}$
B) $G = \{|z - 1 + i| < 1\}$, $G^* = \{|w + 1| > 2\}$
9. A) $G = \{|z + 1| < 1\}$, $G^* = \{\operatorname{Re} w > -1\}$
B) $G = \{|z - 1| < 2\}$, $G^* = \{|w - i| < 1\}$
10. A) $G = \{\operatorname{Im} z > 0\}$, $G^* = \{|w - i| < 1\}$
B) $G = \{|z - 2| < 2\}$, $G^* = \{|w - 2| < 4\}$

Odredi neku funkciju koja preslikava zadano područje na gornju poluravninu $\{\text{Im } w > 0\}$:

11. A) $G = \{|z| < 1, \text{Im } z > 0\}$
B) $G = \{|z| < 1, |z - 1| < 1\}$
12. A) $G = \{|z| > 1, \text{Im } z > 0\}$
B) $G = \{|z| < 1, |z - i| > 1\}$
13. A) $G = \{|z| > 1, |z - i| < 1\}$
B) $G = \{|z| < 1, |z - 1| > 1\}$

Odredi sliku područja ili krivulje G pri preslikavanju funkcijom w .

14. A) $G = \{|\text{Im } z| < \pi\}$, $w = e^z$
B) $G = \{0 < \text{Re } z < \pi, \text{Im } z < 0\}$, $w = \cos z$
15. A) $G = \{0 < \text{Im } z < 2\pi, 0 < \text{Re } z < 1\}$, $w = e^z$
B) $G = \{0 < \text{Im } z < \pi\}$, $w = \text{ch } z$
16. A) $G = \{0 < \text{Re } z < \pi, \text{Im } z > 0\}$, $w = e^{iz}$
B) $G = \{\text{Re } z > 0, -\pi < \text{Im } z < \pi\}$, $w = \text{sh } z$
17. A) $G = \{\text{Im } z > 0\}$, $w = \text{Ln } z$, $w(i) = \frac{\pi i}{2}$
B) $G = \{-\frac{\pi}{2} < \text{Re } z < \frac{\pi}{2}, \text{Im } z > 0\}$, $w = \cos z$
18. A) $G = \{0 < \text{Re } z < 2\pi, \text{Im } z > 0\}$, $w = \sin z$
B) $G = \{\text{Im } z > 0\}$, $w = z^2$
19. A) $G = \{0 < \text{Re } z < \pi, \text{Im } z > 0\}$, $w = \text{tg } z$
B) $G = \{\arg z = \frac{\pi}{6}\}$, $w = z^3$
20. A) $G = \{\text{Re } z > 1\}$, $w = z^2$
B) $G = \{|z| = 1, |\arg z| < \frac{\pi}{3}\}$, $w = z^3$