Problem 4.2

0.0/8.0 points (ungraded)

Consider the regular branch of fucntions $\varphi_1(z) = \sqrt{z - e^{-i\alpha}}$ and $\varphi_2(z) = \ln\left(z - e^{-i\alpha}\right)$ $\alpha \in (0, \pi/2)$.

The branches are deifned by conditions $\varphi_1(0) = ie^{-i\alpha/2}$, a $\varphi_2(0) = -i\pi - i\alpha$

Find $\varphi_{1,2}\left(e^{i\alpha}\right)$, $\varphi_{1,2}(i)$ for:

a) branchcut in fig. 2(a),

b) branchcut in fig. 2(b),

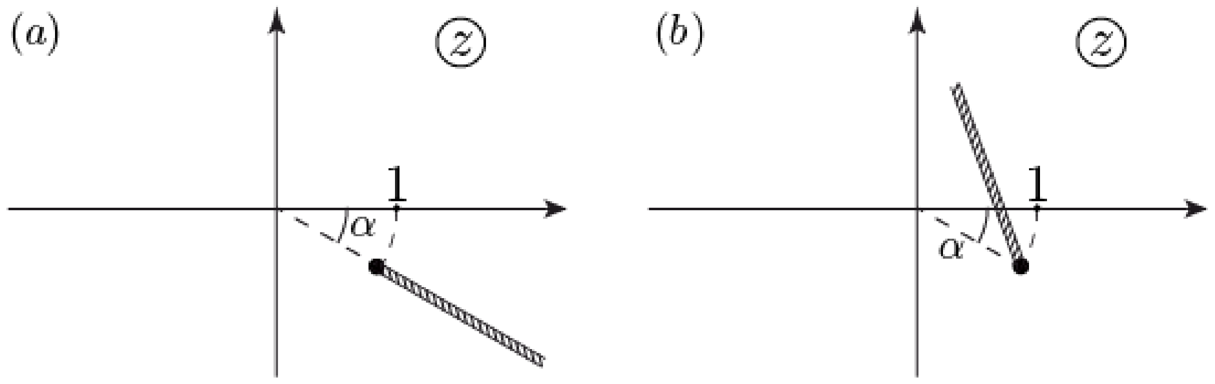

Fig. 2.

a.1)

Use i for complex unity, sqrt(#) for $\sqrt{\#}$, e^(#) for the exponential and sin() for $\sin()$ function. Present the answer in the exponential form

$\varphi_1\left(e^{i\alpha}\right) =$

a.2)

$$\varphi_1(i) = \square\left(\frac{\square}{\square}\pi + \frac{\square}{\square}\alpha\right)\sqrt{\square\cdot\square}$$

1	3	2	4	8	α

a.3)

$$\varphi_2(e^{i\alpha}) = \frac{\square}{\square}\pi i + \square\left[\square\cdot\square\left(\square\right)\right]$$

1	-1	3	-3	2	4

a.4)

$$\varphi_2(i) = \frac{\square}{\square}\pi i + \frac{\square}{\square} i + \square \Big[\square \cdot \square \Big($$

1	-1	-3	2	4	5

b.1)

$$\varphi_1(e^{i\alpha}) = \square \left(\frac{\square}{\square} i\pi \right) \sqrt{\square \cdot \square \Big(\square}$$

1	-1	-3	2	4	5

b.2)

$$\varphi_1(i) = \square \left(\frac{\square}{\square}\pi + \frac{\square}{\square}\alpha \right) \sqrt{\square \cdot \square}$$

3	$5i$	$-5i$	2	4	8

b.3)

$$\varphi_2(e^{i\alpha}) = \frac{\square}{\square}\pi i + \square \left[\square \cdot \square \left(\square \right) \right]$$

1	-1	3	-3	2	4

b.4)

$$\varphi_2(i) = \frac{\boxed{}\,\pi i}{\boxed{}} + \frac{\boxed{}\,i}{\boxed{}} + \boxed{}\left[\boxed{} \cdot \boxed{}\left(\right.\right.$$

	1	-1	3	2	4	5	

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