## Problem 4.2

0.0/8.0 points (ungraded)

Consider the regular branch of fucntions  $arphi_{1}\left(z
ight)=\sqrt{z-e^{-ilpha}}$  and  $arphi_{2}\left(z
ight)=\ln\left(z-e^{-ilpha}
ight)lpha\in\left(0,\pi/2
ight).$ 

The branches are deifned by conditions  $arphi_{1}\left(0
ight)=ie^{-ilpha/2}$  , a  $arphi_{2}\left(0
ight)=-i\pi-ilpha$ 

Find  $arphi_{1,2}\left(e^{ilpha}
ight),\;arphi_{1,2}\left(i
ight)$  for:

- a) branchcut in fig. 2(a),
- b) branchcut in fig. 2(b),

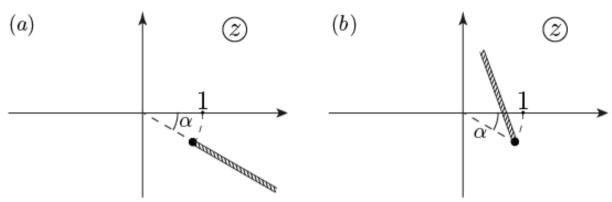


Fig. 2.

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

$$arphi_1 \ (e^{ilpha}) =$$

a.2)

$$\varphi_1(i) = \left[ \frac{\pi}{1 - 1 - 1} + \frac{\pi}{1 - 1 - 1} \right] \sqrt{1 - 1 - 1 - 1}$$

1 3  $^{2}$ 4 8  $\alpha$ 

a.3)

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

1 4 a.4)

2 5 -31 -14

b.1)

$$\varphi_1(e^{i\alpha}) = \left[ \frac{1}{1 - 1 - 1} \right] \sqrt{\frac{1}{1 - 1 - 1}}$$

2 1 -14 5

b.2)

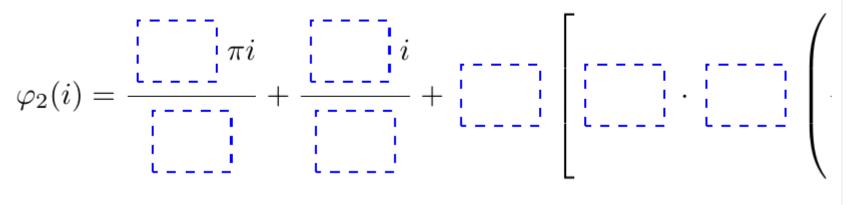
$$\varphi_1(i) = \left[ \frac{1}{2\pi i} + \frac{1}{2\pi i} \alpha \right] \sqrt{\frac{1}{2\pi i} + \frac{1}{2\pi i}}$$

3 2 8 5i-5i4

b.3)

2 1 4 -1

b.4)



3 2 5 1 4 -1

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