Problem 4.1

0.0/6.0 points (ungraded)

a) Consider a regular branch $arphi\left(z
ight)=\sqrt[3]{z}$ with a branchcut $z\in[0,i\infty]$ (see fig.1(a)). The regular branch is defined by the condition $arphi\left(-1
ight)=e^{i\pi/3}$.

Find $arphi\left(1
ight),\ arphi\left(i+0
ight)$ and $arphi\left(i-0
ight).$

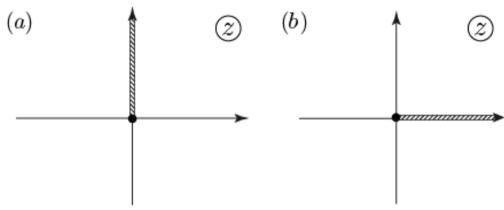


Fig. 1.

a.1)

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

$$\varphi\left(1\right) =$$

a.2)

Present the answer in the exponential form

$$arphi\left(i+0
ight)=$$

a.3)

Present the answer in the exponential form

$$\varphi\left(i-0
ight) =$$



b) Consider the regular branch of function $arphi\left(z
ight)=\ln z$ with a branchcut $z\in\left[0,+\infty
ight]$ (see. fig. 1(b)).

The regular branch is defined by the condition

$$\varphi\left(1-i0\right)=0.$$

Find $arphi\left(1+i0
ight),\;arphi\left(i
ight)$ and $arphi\left(-i
ight).$

b.1)

Present the answer in the algebraic form

$$arphi\left(1+i0
ight)=$$

b.2)

Present the answer in the algebraic form

$$arphi\left(i
ight) =% {\displaystyle\int\limits_{i}^{\infty }} {{\left(i
ight) }} dt$$

Present the answer in the algebraic form