> # 1

> $z := 8$

$$z := 8 \tag{1}$$

> $f := k \to \sqrt[3]{|z|}\left(\cos\left(\frac{\text{argument}(z) + 2\cdot\text{Pi}\cdot k}{3}\right) + I\cdot\sin\left(\frac{\text{argument}(z) + 2\cdot\text{Pi}\cdot k}{3}\right)\right)$

$$f := k \to |z|^{1/3}\left(\cos\left(\frac{1}{3}\,\text{argument}(z) + \frac{2}{3}\,\pi\,k\right) + \mathrm{I}\sin\left(\frac{1}{3}\,\text{argument}(z) + \frac{2}{3}\,\pi\,k\right)\right) \tag{2}$$

> **for** n **from** 1 **to** 3 **do** *simplify*(*evalc*($f(n)$));**end do**

$$-1 + \mathrm{I}\sqrt{3}$$
$$-1 - \mathrm{I}\sqrt{3}$$
$$2 \tag{3}$$

> *restart*

> #2

> $z := 1 - \text{Pi}\cdot I$

$$z := 1 - \mathrm{I}\,\pi \tag{4}$$

> $\cosh(z) = \cos(\text{Re}(z))\cdot\cosh(\text{Im}(z)) - I\cdot\sin(\text{Re}(z))\cdot\sinh(\text{Im}(z))$

$$-\cosh(1) = \cos(1)\cosh(\pi) + \mathrm{I}\sin(1)\sinh(\pi) \tag{5}$$

> *restart*

> # 3

> $z := 2 - I$

$$z := 2 - \mathrm{I} \tag{6}$$

> $Ln := z \to evalf(\ln(|z|)) + I\cdot(\text{argument}(z) + 2\cdot\text{Pi}\cdot k)$

$$Ln := z \to evalf(\ln(|z|)) + \mathrm{I}\,(\text{argument}(z) + 2\,\pi\,k) \tag{7}$$

> $Arctg := z \to -\frac{I}{2}\cdot Ln\left(\frac{1 + z\cdot I}{1 - z\cdot I}\right) + k\cdot\text{Pi}$

$$Arctg := z \to -\frac{1}{2}\,\mathrm{I}\,Ln\left(\frac{1 + \mathrm{I}\,z}{1 - \mathrm{I}\,z}\right) + \pi\,k \tag{8}$$

> *evalc*(*Arctg*(z))

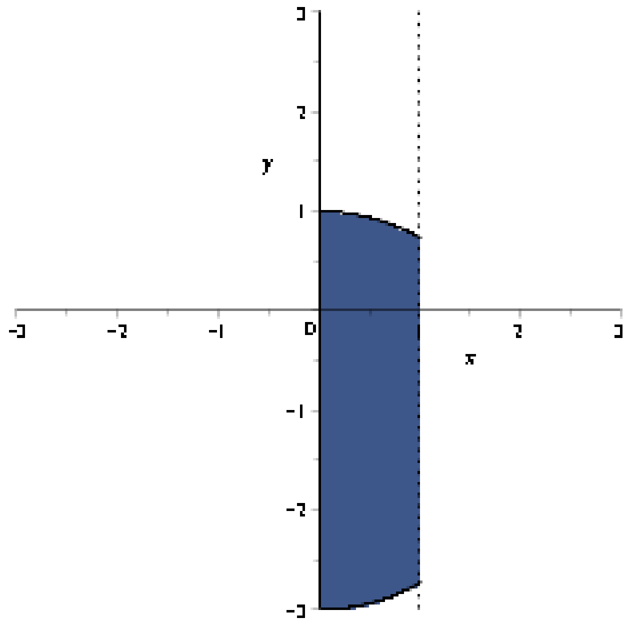
$$-0.1732867952\,\mathrm{I} + \frac{3}{8}\,\pi + 2\,\pi\,k \tag{9}$$

> *restart*

> #4

> with(plots) :

> $plots[inequal]\left(\left[\sqrt{(x)^2 + (y+1)^2} \le 2, 0 \le \mathrm{x} < 1\right], x = -3..3, y = -3..3\right)$



> restart;
#5

> $z := 3\cdot\cosh(2\cdot t) - I\cdot 2\cdot\sinh(2\cdot t)$

$$z := 3\cosh(2t) - 2\,\mathrm{I}\sinh(2t) \tag{10}$$

> $EQCure := z \rightarrow solve(x = evalc(\mathrm{Re}(z)), t) + solve(y - evalc(\mathrm{Im}(z)), t) = 0$

$$EQCure := z \rightarrow solve(x = evalc(\Re(z)), t) + solve(y - evalc(\Im(z)), t) = 0 \tag{11}$$

> $EQCure(z)$

$$\frac{1}{2}\operatorname{arccosh}\left(\frac{1}{3}x\right) - \frac{1}{2}\operatorname{arcsinh}\left(\frac{1}{2}y\right) = 0 \tag{12}$$

> restart;
#6

> $v := \exp(-y)\cos(x)$

$$v := \mathrm{e}^{-y}\cos(x) \tag{13}$$

> $R := v \rightarrow diff(v, y) + I\cdot diff(v, x)$

$$R := v \rightarrow \frac{\partial}{\partial y}v + \mathrm{I}\left(\frac{\partial}{\partial x}v\right) \tag{14}$$

> $simplify(R(v), \{x + I\cdot y = z\})$

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$$\frac{-\mathrm{I}\sin(x)-\cos(x)}{\mathrm{e}^{\mathrm{I}x-\mathrm{I}z}} \tag{15}$$

> $dsolve(\{diff(f(z),z)=\%, f(0)=1\})$

$$f(z)=\mathrm{I}\,\mathrm{e}^{-\mathrm{I}(x-z)}\left(\mathrm{I}\sin(x)+\cos(x)\right)+1-\mathrm{I}\,\mathrm{e}^{-\mathrm{I}x}\left(\mathrm{I}\sin(x)+\cos(x)\right) \tag{16}$$

> $restart;$
> #13

> $res1 := residue\left(\frac{2\,z\cdot(z-1)}{\sin(z)}, z=0\right)$

$$res1 := 0 \tag{17}$$

$$z+\frac{1}{8}\,z^3+\frac{1}{8}\,\mathrm{I}\,z^4+\mathrm{O}(z^5) \tag{18}$$

> $res2 := residue\left(\frac{2\,z\cdot(z-1)}{\sin(z)}, z=\mathrm{Pi}\right)$

$$res2 := -2\,\pi^2+2\,\pi \tag{19}$$

> $2\cdot\mathrm{Pi}\cdot I\cdot(res1+res2)$

$$2\,\mathrm{I}\,\pi\left(-2\,\pi^2+2\,\pi\right) \tag{20}$$

> $restart;$
> #14

> $2\cdot\mathrm{Pi}\cdot I\cdot residue\left(\frac{1-\sin\left(\frac{1}{z}\right)}{z}, z=0\right)$

$$2\,\mathrm{I}\,\pi\,residue\left(\frac{1-\sin\left(\frac{1}{z}\right)}{z}, z=0\right) \tag{21}$$

> $restart;$
> #15

> $2\cdot\mathrm{Pi}\cdot I\cdot residue\left(\frac{\cosh(z)-\cos(3\,z)}{z^2\cdot\sin(5\cdot\mathrm{Pi}\cdot z)}, z=0\right)$

$$2\,\mathrm{I} \tag{22}$$

> $\int_0^{2\,\mathrm{Pi}}\frac{1}{\left(\sqrt{5}+\sqrt{3}\cos(x)\right)^2}\,\mathrm{d}x$

$$\frac{1}{2}\,\frac{\pi\left(\sqrt{5}\,\sqrt{3}+5\right)\sqrt{2}}{\sqrt{3}+\sqrt{5}} \tag{23}$$

> $evalf(\%)$

$$4.967294132 \tag{24}$$

> $\int_0^{2\cdot\mathrm{Pi}}\frac{1}{8-3\cdot\sqrt{7}\cdot\sin(x)}\,\mathrm{d}x$

$$2\,\pi \tag{25}$$

>

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$$\frac{1}{2}\,\frac{\pi\,(\sqrt{5}\,\sqrt{3}+5)\,\sqrt{2}}{\sqrt{3}+\sqrt{5}} \tag{26}$$

> $\int_{-infinity}^{+infinity} \frac{1}{(x^2+4)^2\cdot(x^2+9)}\,dx$

$$\frac{7}{1200}\,\pi \tag{27}$$

> $simplify\left(\int_{-infinity}^{+infinity} \frac{(x^3-2)\cdot\cos\left(\frac{x}{2}\right)}{(x^2+1)^2}\,dx\right)$

$$-\frac{3}{2}\,\pi\left(\cosh\left(\frac{1}{2}\right)-\sinh\left(\frac{1}{2}\right)\right) \tag{28}$$

>