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Integrate[1/(z^2) Exp[1/2 c (z^2)], {z, 0, 1}]
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Integrate[Exp[1/2 c (z^2)], {z, 0, 1}]
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$$\frac{\sqrt{\frac{\pi}{2}}\ \text{Erfi}\left[\frac{\sqrt{c}}{\sqrt{2}}\right]}{\sqrt{c}}$$

```
D[1/Log[x], x]
```

$$-\frac{1}{x\ \text{Log}[x]^2}$$

```
D[LogIntegral[x], x]
D[1/LogIntegral[x], x]
```

$$\frac{1}{\text{Log}[x]}$$

$$-\frac{1}{\text{Log}[x]\ \text{LogIntegral}[x]^2}$$

```
Series[LogIntegral[x], {x, 0, 2}] // FullSimplify
```

$$\begin{cases} \frac{1}{\text{Log}[x]^6} \left(120 + \text{Log}[x] \left(24 + \text{Log}[x] \left(6 + \text{Log}[x] \left(2 + \text{Log}[x] + \text{Log}[x]^2\right)\right)\right)\right) x + O[x]^3 & \text{Arg}[x] < \pi \&\& \text{Arg}[-x] \geq \pi \\ \frac{1}{(-i\pi + \text{Log}[x])^6} \left(120 - 6\left(\pi + i\,\text{Log}[x]\right)^2 + \left(\pi + i\,\text{Log}[x]\right)^4 + 24\left(-i\pi + \text{Log}[x]\right) + 2\left(-i\pi + \text{Log}[x]\right)^3 + \left(-i\pi + \text{Log}[x]\right)^5\right) x + O[x]^3 & \text{Arg}[x] \geq \pi \&\& \text{Arg}[-x] \geq \pi \\ -i\pi + \frac{1}{\text{Log}[x]^6} \left(120 + \text{Log}[x] \left(24 + \text{Log}[x] \left(6 + \text{Log}[x] \left(2 + \text{Log}[x] + \text{Log}[x]^2\right)\right)\right)\right) x + O[x]^3 & \text{Arg}[x] < \pi \&\& 0 < \text{Arg}[-x] < \pi \\ i\pi + \frac{1}{\text{Log}[x]^6} \left(120 + \text{Log}[x] \left(24 + \text{Log}[x] \left(6 + \text{Log}[x] \left(2 + \text{Log}[x] + \text{Log}[x]^2\right)\right)\right)\right) x + O[x]^3 & \text{Arg}[x] < \pi \&\& \text{Arg}[-x] \leq 0 \\ -i\pi + \frac{1}{(-i\pi + \text{Log}[x])^6} \left(120 - 6\left(\pi + i\,\text{Log}[x]\right)^2 + \left(\pi + i\,\text{Log}[x]\right)^4 + 24\left(-i\pi + \text{Log}[x]\right) + 2\left(-i\pi + \text{Log}[x]\right)^3 + \left(-i\pi + \text{Log}[x]\right)^5\right) x + O[x]^3 & \text{Arg}[x] \geq \pi \&\& 0 < \text{Arg}[-x] < \pi \\ i\pi + \frac{1}{(-i\pi + \text{Log}[x])^6} \left(120 - 6\left(\pi + i\,\text{Log}[x]\right)^2 + \left(\pi + i\,\text{Log}[x]\right)^4 + 24\left(-i\pi + \text{Log}[x]\right) + 2\left(-i\pi + \text{Log}[x]\right)^3 + \left(-i\pi + \text{Log}[x]\right)^5\right) x + O[x]^3 & \text{True} \end{cases}$$

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Assuming[x ∈ Reals, Series[LogIntegral[x], {x, 0, 3}]]
```

$$\begin{cases} i\pi & x == 0 \\ \frac{\left(720+120\,\text{Log}[x]+24\,\text{Log}[x]^2+6\,\text{Log}[x]^3+2\,\text{Log}[x]^4+\text{Log}[x]^5+\text{Log}[x]^6\right)x}{\text{Log}[x]^7}+O[x]^4 & x > 0 \\ i\pi + \frac{1}{(\pi+i\,\text{Log}[x])^7}\,i\left(-720+120\,i\,\pi+24\,\pi^2-6\,i\,\pi^3-2\,\pi^4+i\,\pi^5+\pi^6-120\,\text{Log}[x]+48\,i\,\pi\,\text{Log}[x]+\right. & \text{True} \\ \quad 18\,\pi^2\,\text{Log}[x]-8\,i\,\pi^3\,\text{Log}[x]-5\,\pi^4\,\text{Log}[x]+6\,i\,\pi^5\,\text{Log}[x]-24\,\text{Log}[x]^2+ \\ \quad 18\,i\,\pi\,\text{Log}[x]^2+12\,\pi^2\,\text{Log}[x]^2-10\,i\,\pi^3\,\text{Log}[x]^2-15\,\pi^4\,\text{Log}[x]^2- \\ \quad 6\,\text{Log}[x]^3+8\,i\,\pi\,\text{Log}[x]^3+10\,\pi^2\,\text{Log}[x]^3-20\,i\,\pi^3\,\text{Log}[x]^3-2\,\text{Log}[x]^4+ \\ \quad \left.5\,i\,\pi\,\text{Log}[x]^4+15\,\pi^2\,\text{Log}[x]^4-\text{Log}[x]^5+6\,i\,\pi\,\text{Log}[x]^5-\text{Log}[x]^6\right)x+O[x]^4 & \end{cases}$$

In[1]:=
```
D[x/Log[x], {x, 1}]
D[x/Log[x], {x, 1}] // FullSimplify
D[x/Log[x], {x, 2}]
D[x/Log[x], {x, 2}] // FullSimplify
D[x/Log[x], {x, 3}]
D[x/Log[x], {x, 3}] // FullSimplify
D[x/Log[x], {x, 4}] // FullSimplify
D[x/Log[x], {x, 5}] // FullSimplify
```

Out[1]= $-\frac{1}{\text{Log}[x]^2}+\frac{1}{\text{Log}[x]}$

Out[2]= $\frac{-1+\text{Log}[x]}{\text{Log}[x]^2}$

Out[3]= $x\left(\frac{2}{x^2\,\text{Log}[x]^3}+\frac{1}{x^2\,\text{Log}[x]^2}\right)-\frac{2}{x\,\text{Log}[x]^2}$

Out[4]= $\frac{2-\text{Log}[x]}{x\,\text{Log}[x]^3}$

Out[5]= $x\left(-\frac{6}{x^3\,\text{Log}[x]^4}-\frac{6}{x^3\,\text{Log}[x]^3}-\frac{2}{x^3\,\text{Log}[x]^2}\right)+3\left(\frac{2}{x^2\,\text{Log}[x]^3}+\frac{1}{x^2\,\text{Log}[x]^2}\right)$

Out[6]= $\frac{-6+\text{Log}[x]^2}{x^2\,\text{Log}[x]^4}$

Out[7]= $\frac{24-2\,\text{Log}[x]\left(-6+\text{Log}[x]+\text{Log}[x]^2\right)}{x^3\,\text{Log}[x]^5}$

Out[8]= $\frac{2\left(-60+\text{Log}[x]\left(-60+\text{Log}[x]\left(-15+\text{Log}[x]\left(5+3\,\text{Log}[x]\right)\right)\right)\right)}{x^4\,\text{Log}[x]^6}$