```
------

--- http : // dlmf .nist .gov / 8.4 .E4  This  should produce zero for all complex  z

In[ ]:= expr = Gamma [0, z] - Integrate [(t)^(-1) * Exp[-t], {t, z, Infinity }]

Out[ ]= 0  if  Re[z] > 0 && Im[z] == 0

In[ ]:= expr =
  Gamma [0, z] - Integrate [(t)^(-1) * Exp[-t], {t, z, Infinity }, GenerateConditions  → False ]

Out[ ]= - Log[z]

In[ ]:= expr = Gamma [0, z] - Integrate [(t)^(-1) * Exp[-t], {t, z, Infinity }, GenerateConditions  → None ]

Out[ ]= 0  if  Re[z] > 0 && Im[z] == 0

In[ ]:= expr = Hold [Gamma [0, z] - Integrate [(t)^(-1) * Exp[-t], {t, z, Infinity }]]

Out[ ]= Hold[Gamma[0, z] - ∫_z^∞ Exp[-t]/t dt]

In[ ]:= N[ReleaseHold [ReplaceAll [expr , {z → I}]]]

Out[ ]= 0. + 0. i

In[ ]:= expr = Gamma [0, z] - Integrate [(t)^(-1) * Exp[-t], {t, z, Infinity }]

Out[ ]= 0  if  Re[z] > 0 && Im[z] == 0

In[ ]:= N[ReleaseHold [ReplaceAll [expr , {z → I}]]]

Out[ ]= Undefined

--- http : // dlmf .nist .gov / 10.43 .E8

In[ ]:= expr = (Integrate [Exp[+t] * (t)^(-v) * BesselI [v, t], {t, 0, x}, GenerateConditions  → None ]) -
    (- Divide [Exp[+x] * (x)^(-v + 1), 2 * v - 1] * (BesselI [v, x] - BesselI [v - 1, x]) -
      Divide [(2)^(-v + 1), (2 * v - 1) * Gamma [v]])

Out[ ]= e^x x^(-v) (-x + 2 v) BesselI[v, x] / (-1 + 2 v) + e^x x^(1-v) (-BesselI[-1 + v, x] + BesselI[v, x]) / (-1 + 2 v) +
  e^x x^(1-v) BesselI[1 + v, x] / (-1 + 2 v) + 2^(1-v) / ((-1 + 2 v) Gamma[v]) + 2^v √π v Sec[π v] / (Gamma[3/2 - v] Gamma[1 + 2 v])

In[ ]:= N[ReplaceAll [expr , {Rule[x, 1.5], Rule[v, 1.5]}]]

Out[ ]= 0.398942
```

In[ ]:=
```
expr = (Integrate [Exp[+t] * (t)^(- v) * BesselI [v, t], {t, 0, x}, GenerateConditions → False ]) -
  (- Divide [Exp[+x] * (x)^(- v + 1), 2 * v - 1] * (BesselI [v, x] - BesselI [v - 1, x]) -
    Divide [(2)^(- v + 1), (2 * v - 1) * Gamma [v]])
```

Out[ ]=
$$\frac{e^{x}\, x^{1-v}\, (-\text{BesselI}[-1+v, x] + \text{BesselI}[v, x])}{-1+2v} + \frac{e^{x}\, x^{-v}\, (-(x-2v)\,\text{BesselI}[v, x] + x\,\text{BesselI}[1+v, x])}{-1+2v} + \frac{2^{1-v}}{(-1+2v)\,\text{Gamma}[v]} + \frac{2^{v}\,\sqrt{\pi}\; v\,\text{Sec}[\pi v]}{\text{Gamma}\left[\frac{3}{2}-v\right]\text{Gamma}[1+2v]}$$

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 1.5], Rule [v, 1.5]}]]
```

Out[ ]=
```
0.398942
```

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 3 / 2], Rule [v, 3 / 2]}]]
```

```
••• Infinity : Indeterminate expression 0 2 √2 √π ComplexInfinity encountered .
```

Out[ ]=
```
Indeterminate
```

In[ ]:=
```
N[ReplaceAll [expr , {x → 1.5 , v → 1.5}]]
```

Out[ ]=
```
0.398942
```

In[ ]:=
```
N[ReplaceAll [expr , {x → 3 / 2, v → 3 / 2}]]
```

```
••• Infinity : Indeterminate expression 0 2 √2 √π ComplexInfinity encountered .
```

Out[ ]=
```
Indeterminate
```

In[ ]:=
```
expr = (Integrate [Exp[+t] * (t)^(- v) * BesselI [v, t], {t, 0, x}]) -
  (- Divide [Exp[+x] * (x)^(- v + 1), 2 * v - 1] * (BesselI [v, x] - BesselI [v - 1, x]) -
    Divide [(2)^(- v + 1), (2 * v - 1) * Gamma [v]])
```

Out[ ]=
$$\frac{e^{x}\, x^{1-v}\, (-\text{BesselI}[-1+v, x] + \text{BesselI}[v, x])}{-1+2v} + \frac{e^{x}\, x^{-v}\, (-(x-2v)\,\text{BesselI}[v, x] + x\,\text{BesselI}[1+v, x])}{-1+2v} + \frac{2^{1-v}}{(-1+2v)\,\text{Gamma}[v]} + \frac{2^{v}\,\sqrt{\pi}\; v\,\text{Sec}[\pi v]}{\text{Gamma}\left[\frac{3}{2}-v\right]\text{Gamma}[1+2v]}$$

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 1.5], Rule [v, 1.5]}]]
```

Out[ ]=
```
0.398942
```

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 3 / 2], Rule [v, 3 / 2]}]]
```

```
••• Infinity : Indeterminate expression 0 2 √2 √π ComplexInfinity encountered .
```

Out[ ]=
```
Indeterminate
```

In[ ]:=
```
x = 3 / 2;
v = 3 / 2;
N[(NIntegrate [Exp[+t] * (t) ^ (- v) * BesselI [v, t], {t, 0, x}, WorkingPrecision → 20]) -
  (- Divide [Exp[+x] * (x) ^ (- v + 1), 2 * v - 1] * (BesselI [v, x] - BesselI [v - 1, x]) -
    Divide [(2) ^ (- v + 1), (2 * v - 1) * Gamma [v]]), 20]
```

Out[ ]= $0. \times 10^{-20}$

--- http : // dlmf .nist .gov / 10.43 .E10

In[ ]:=
```
Clear [v, t, x];
expr = (Integrate [Exp[t] * (t) ^ (- v) * BesselK [v, t], {t, x, Infinity }, GenerateConditions → None ]) - (Divide [Exp[x] * (x) ^ (- v + 1), 2 * v - 1] * (BesselK [v, x] + BesselK [v - 1, x]))
```

Out[ ]=
$$-\frac{e^x\, x^{1-v}\,(\text{BesselK}[-1+v,\,x]+\text{BesselK}[v,\,x])}{-1+2v}+\frac{1}{2(-1+2v)}$$
$$e^x\,\pi\,x^{-v}\,(-x\,\text{BesselI}[1-v,\,x]+x\,\text{BesselI}[-v,\,x]-(x-2v)\,\text{BesselI}[v,\,x]+x\,\text{BesselI}[1+v,\,x])$$
$$\text{Csc}[\pi v] \quad \text{if} \quad \text{Re}[x] > 0 \;\&\&\; \text{Im}[x] == 0 \;\&\&\; \text{Re}[v] > \frac{1}{2}$$

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 1.5], Rule [v, Power [E, Times [Complex [0, Rational [1, 6]], Pi]]]}]
```

Out[ ]= $-2.22045 \times 10^{-16} + 4.44089 \times 10^{-16}\, i$

In[ ]:=
```
expr =
 (Integrate [Exp[t] * (t) ^ (- v) * BesselK [v, t], {t, x, Infinity }, GenerateConditions → False ]) -
  (Divide [Exp[x] * (x) ^ (- v + 1), 2 * v - 1] * (BesselK [v, x] + BesselK [v - 1, x]))
```

Out[ ]=
$$-\frac{e^x\, x^{1-v}\,(\text{BesselK}[-1+v,\,x]+\text{BesselK}[v,\,x])}{-1+2v}+$$
$$\frac{1}{\sqrt{\pi}\,(-1+2v)}\,2^{-1-v}\,x^{-v}\,\text{Csc}[\pi v]\Big(-2^v\,e^x\,\pi^{3/2}\,x\,\text{BesselI}[1-v,\,x]+2^v\,e^x\,\pi^{3/2}\,x\,\text{BesselI}[-v,\,x]-$$
$$2^v\,e^x\,\pi^{3/2}\,x\,\text{BesselI}[v,\,x]+2^{1+v}\,e^x\,\pi^{3/2}\,v\,\text{BesselI}[v,\,x]+2^v\,e^x\,\pi^{3/2}\,x\,\text{BesselI}[1+v,\,x]-$$
$$e^{i\pi v}\,\pi^{3/2}\,x^v\,\text{Hypergeometric2F1Regularized}\left[\frac{1}{2},\,1,\,1+v,\,1\right]+$$
$$2\,e^{i\pi v}\,\pi^{3/2}\,x^v\,v\,\text{Hypergeometric2F1Regularized}\left[\frac{1}{2},\,1,\,1+v,\,1\right]-$$
$$4^v\,x^v\,v\,\Gamma\left[-\frac{1}{2}+v\right]\Gamma[-2v]\,\text{Sin}[2\pi v]+2^{1+2v}\,x^v\,v^2\,\Gamma\left[-\frac{1}{2}+v\right]\Gamma[-2v]\,\text{Sin}[2\pi v]\Big)$$

In[ ]:=
```
N[ReplaceAll [expr , {Rule [x, 1.5], Rule [v, Power [E, Times [Complex [0, Rational [1, 6]], Pi]]]}]
```

Out[ ]= $-0.80933 - 0.0874672\, i$

In[ ]:=
```
expr = (Integrate [Exp[t] * (t) ^ (- v) * BesselK [v, t], {t, x, Infinity }]) -
  (Divide [Exp[x] * (x) ^ (- v + 1), 2 * v - 1] * (BesselK [v, x] + BesselK [v - 1, x]))
```

Out[ ]=
$$-\frac{e^{x}\, x^{1-v}\,(\text{BesselK}[-1+v,\,x]+\text{BesselK}[v,\,x])}{-1+2v}+\frac{1}{2\,(-1+2v)}$$
$$e^{x}\,\pi\,x^{-v}\,(-x\,\text{BesselI}[1-v,\,x]+x\,\text{BesselI}[-v,\,x]-(x-2v)\,\text{BesselI}[v,\,x]+x\,\text{BesselI}[1+v,\,x])$$
$$\text{Csc}[\pi v] \quad \text{if} \quad \text{Re}[x] > 0 \;\&\&\; \text{Im}[x] == 0 \;\&\&\; \text{Re}[v] > \frac{1}{2}$$

In[ ]:=
```
N[ReplaceAll [expr , {Rule[x, 1.5], Rule[v, Power [E, Times [Complex [0, Rational [1, 6]], Pi]]}]]
```

Out[ ]=
$$-2.22045 \times 10^{-16} + 4.44089 \times 10^{-16}\, i$$

--- http : // dlmf .nist .gov / 11.5 .E2

In[ ]:=
```
expr = 2 (z / 2) ^ v / (Sqrt [Pi] Gamma [v + 1 / 2])
    Integrate [Exp[- z t] (1 + t ^ 2) ^ (v - 1 / 2), {t, 0, Infinity }] - StruveH [v, z] + BesselY [v, z]
```

Out[ ]=
$$\text{BesselY}[v,\,z]-\text{StruveH}[v,\,z]+\frac{\pi\,(-\text{BesselJ}[v,\,z]\,\text{Csc}[\pi v]+2\,\text{BesselJ}[-v,\,z]\,\text{Csc}[2\pi v]+\text{Sec}[\pi v]\,\text{StruveH}[v,\,z])}{\text{Gamma}\left[\frac{1}{2}-v\right]\text{Gamma}\left[\frac{1}{2}+v\right]} \quad \text{if} \quad \text{Re}[z] > 0$$

In[ ]:=
```
N[ReplaceAll [expr , {z → 1.5 , v → 1.5}]]
```

Out[ ]=
$$-0.922916$$

In[ ]:=
```
expr = 2 (z / 2) ^ v / (Sqrt [Pi] Gamma [v + 1 / 2]) Integrate [Exp[- z t] (1 + t ^ 2) ^ (v - 1 / 2),
     {t, 0, Infinity }, GenerateConditions  → False ] - StruveH [v, z] + BesselY [v, z]
```

Out[ ]=
$$\text{BesselY}[v,\,z]-\text{StruveH}[v,\,z]+\frac{\pi\,(-\text{BesselJ}[v,\,z]\,\text{Csc}[\pi v]+2\,\text{BesselJ}[-v,\,z]\,\text{Csc}[2\pi v]+\text{Sec}[\pi v]\,\text{StruveH}[v,\,z])}{\text{Gamma}\left[\frac{1}{2}-v\right]\text{Gamma}\left[\frac{1}{2}+v\right]}$$

In[ ]:=
```
N[ReplaceAll [expr , {z → 1.5 , v → 1.5}]]
```

Out[ ]=
$$-0.922916$$

In[ ]:=
```
expr = 2 (z / 2) ^ v / (Sqrt [Pi] Gamma [v + 1 / 2]) Integrate [Exp[- z t] (1 + t ^ 2) ^ (v - 1 / 2),
     {t, 0, Infinity }, GenerateConditions  → None ] - StruveH [v, z] + BesselY [v, z]
```

Out[ ]=
$$\text{BesselY}[v,\,z]-\text{StruveH}[v,\,z]+\frac{\pi\,(-\text{BesselJ}[v,\,z]\,\text{Csc}[\pi v]+2\,\text{BesselJ}[-v,\,z]\,\text{Csc}[2\pi v]+\text{Sec}[\pi v]\,\text{StruveH}[v,\,z])}{\text{Gamma}\left[\frac{1}{2}-v\right]\text{Gamma}\left[\frac{1}{2}+v\right]} \quad \text{if} \quad \text{Re}[z] > 0$$

In[ ]:=
```
N[ReplaceAll [expr , {z → 1.5 , v → 1.5}]]
```

Out[ ]=
$$-0.922916$$

```
In[ ]:= z = 3 / 2;
        v = 3 / 2;
        N[2 (z / 2) ^ v / (Sqrt[Pi] Gamma [v + 1 / 2]) NIntegrate [Exp[- z t] (1 + t ^ 2) ^ (v - 1 / 2),
            {t, 0, Infinity }, WorkingPrecision  → 20] - StruveH [v, z] + BesselY [v, z], 20]
Out[ ]= -2.902 × 10^-17
```

--- http : // dlmf .nist .gov / 18.17 .E14

```
In[ ]:= expr = (Divide [(x) ^ (α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
          (Integrate [Divide [(y) ^ α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
              Divide [(x - y) ^ (μ - 1), Gamma [μ]], {y, 0, x}, GenerateConditions  → None ])
```

$$\text{Out[ ]= } -\text{Integrate}\left[\frac{(x-y)^{-1+\mu}\, y^{\alpha}\, \text{LaguerreL}\,[n, \alpha, y]}{\text{Gamma}\,[1+n+\alpha]\,\text{Gamma}\,[\mu]}, \{y, 0, x\}, \text{GenerateConditions} \to \text{None}\right] + \frac{x^{\alpha+\mu}\, \text{LaguerreL}\,[n, \alpha+\mu, x]}{\text{Gamma}\,[1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 1.5 , α → 1.5 , μ → 1.5}]]
In[ ]:= expr = (Divide [(x) ^ (α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
          (Integrate [Divide [(y) ^ α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
              Divide [(x - y) ^ (μ - 1), Gamma [μ]], {y, 0, x}, GenerateConditions  → None ])
```

$$\text{Out[ ]= } -\text{Integrate}\left[\frac{(x-y)^{-1+\mu}\, y^{\alpha}\, \text{LaguerreL}\,[n, \alpha, y]}{\text{Gamma}\,[1+n+\alpha]\,\text{Gamma}\,[\mu]}, \{y, 0, x\}, \text{GenerateConditions} \to \text{None}\right] + \frac{x^{\alpha+\mu}\, \text{LaguerreL}\,[n, \alpha+\mu, x]}{\text{Gamma}\,[1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 3 / 2, α → 3 / 2, μ → 3 / 2}]]
Out[ ]= 0.
In[ ]:= expr = (Divide [(x) ^ (α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
          (Integrate [Divide [(y) ^ α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
              Divide [(x - y) ^ (μ - 1), Gamma [μ]], {y, 0, x}, GenerateConditions  → None ])
```

$$\text{Out[ ]= } -\text{Integrate}\left[\frac{(x-y)^{-1+\mu}\, y^{\alpha}\, \text{LaguerreL}\,[n, \alpha, y]}{\text{Gamma}\,[1+n+\alpha]\,\text{Gamma}\,[\mu]}, \{y, 0, x\}, \text{GenerateConditions} \to \text{None}\right] + \frac{x^{\alpha+\mu}\, \text{LaguerreL}\,[n, \alpha+\mu, x]}{\text{Gamma}\,[1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 1.5 , α → 1.5 , μ → 1.5}]]
```

```
In[ ]:= expr = (Divide [(x)^(α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
            (Integrate [Divide [(y)^α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
                Divide [(x - y)^(μ - 1), Gamma [μ]], {y, 0, x}, GenerateConditions → None])
```

$$\text{Out[ ]= } -\text{Integrate}\left[\frac{(x-y)^{-1+\mu}\, y^{\alpha}\ \text{LaguerreL}\ [n,\ \alpha,\ y]}{\text{Gamma}\ [1+n+\alpha]\ \text{Gamma}\ [\mu]},\ \{y,\ 0,\ x\},\ \text{GenerateConditions}\ \to \text{None}\right] + \frac{x^{\alpha+\mu}\ \text{LaguerreL}\ [n,\ \alpha+\mu,\ x]}{\text{Gamma}\ [1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 1.5 , α → 1.5 , μ → 1.5}]]
```

```
In[ ]:= expr = (Divide [(x)^(α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
            (Integrate [Divide [(y)^α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
                Divide [(x - y)^(μ - 1), Gamma [μ]], {y, 0, x}, GenerateConditions → None])
```

$$\text{Out[ ]= } -\text{Integrate}\left[\frac{(x-y)^{-1+\mu}\, y^{\alpha}\ \text{LaguerreL}\ [n,\ \alpha,\ y]}{\text{Gamma}\ [1+n+\alpha]\ \text{Gamma}\ [\mu]},\ \{y,\ 0,\ x\},\ \text{GenerateConditions}\ \to \text{None}\right] + \frac{x^{\alpha+\mu}\ \text{LaguerreL}\ [n,\ \alpha+\mu,\ x]}{\text{Gamma}\ [1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 3 / 2, α → 3 / 2, μ → 3 / 2}]]
Out[ ]= 0.
```

```
In[ ]:= expr = (Divide [(x)^(α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
            (Integrate [Divide [(y)^α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
                Divide [(x - y)^(μ - 1), Gamma [μ]], {y, 0, x}])
```

$$\text{Out[ ]= } -\int_0^x \frac{(x-y)^{-1+\mu}\, y^{\alpha}\ \text{LaguerreL}\ [n,\ \alpha,\ y]}{\text{Gamma}\ [1+n+\alpha]\ \text{Gamma}\ [\mu]}\, dy + \frac{x^{\alpha+\mu}\ \text{LaguerreL}\ [n,\ \alpha+\mu,\ x]}{\text{Gamma}\ [1+n+\alpha+\mu]}$$

```
In[ ]:= N[ReplaceAll [expr , {n → 2, x → 1.5 , α → 1.5 , μ → 1.5}]]
```

```
In[1]:= expr = (Divide [(x)^(α + μ) * LaguerreL [n, α + μ, x], Gamma [α + μ + n + 1]]) -
            (Integrate [Divide [(y)^α * LaguerreL [n, α, y], Gamma [α + n + 1]] *
                Divide [(x - y)^(μ - 1), Gamma [μ]], {y, 0, x}])
```

$$\text{Out[1]= } -\int_0^x \frac{(x-y)^{-1+\mu}\, y^{\alpha}\ \text{LaguerreL}\ [n,\ \alpha,\ y]}{\text{Gamma}\ [1+n+\alpha]\ \text{Gamma}\ [\mu]}\, dy + \frac{x^{\alpha+\mu}\ \text{LaguerreL}\ [n,\ \alpha+\mu,\ x]}{\text{Gamma}\ [1+n+\alpha+\mu]}$$

```
In[2]:= N[ReplaceAll [expr , {n → 2, x → 3 / 2, α → 3 / 2, μ → 3 / 2}]]
Out[2]= 0.
```

--- http : // dlmf .nist .gov / 10.22 .E39 :: Correct

answer is $\frac{1}{8} x^2\ \text{HypergeometricPFQ}\ \left[\{1,\ 1\},\ \{2,\ 2,\ 2\},\ -\frac{x^2}{4}\right]$ for $x > 0$

In[150]:=
```
FunctionExpand [Sum[(-1)^(k-1) (x/2)^(2 k)/(2 k k!^2), {k, 1, Infinity }]]
```

Out[150]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right]$$

In[151]:=
```
exprL = Integrate [(BesselJ [0, t])/t,
    {t, x, Infinity }, GenerateConditions -> False ]+ EulerGamma + Log[x/2]
```

Out[151]=
$$\text{EulerGamma} + \frac{1}{8}\left(-8\,\text{EulerGamma} + x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] + 4 \text{ Log}\left[\frac{4}{x^2}\right]\right) + \text{Log}\left[\frac{x}{2}\right]$$

In[152]:=
```
exprR = Integrate [(1 - BesselJ [0, t])/t, {t, 0, x}, GenerateConditions -> False ]
```

Out[152]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] + \text{Log}[x]$$

In[153]:=
```
N[ReplaceAll [exprL - exprR , {x -> 1}]]
```

Out[153]=
```
0.
```

In[154]:=
```
N[ReplaceAll [exprL - exprR , {x -> 2}]]
```

Out[154]=
```
-0.693147
```

In[155]:=
```
exprL = Integrate [(BesselJ [0, t])/t,
    {t, x, Infinity }, GenerateConditions -> None ]+ EulerGamma + Log[x/2]
```

Out[155]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] + \text{Log}[2] + \text{Log}\left[\frac{x}{2}\right] - \text{Log}[x] \quad \text{if } \text{Re}[x] > 0 \&\& \text{Im}[x] == 0$$

In[156]:=
```
exprR = Integrate [(1 - BesselJ [0, t])/t, {t, 0, x}, GenerateConditions -> None ]
```

Out[156]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] \quad \text{if } \text{Re}[x] \geq 0 \&\& \text{Im}[x] == 0$$

In[157]:=
```
N[ReplaceAll [exprL - exprR , {x -> 1}]]
```

Out[157]=
```
0.
```

In[158]:=
```
N[ReplaceAll [exprL - exprR , {x -> 2}]]
```

Out[158]=
```
0.
```

In[159]:=
```
exprL = Integrate [(BesselJ [0, t])/t, {t, x, Infinity }]+ EulerGamma + Log[x/2]
```

Out[159]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] + \text{Log}[2] + \text{Log}\left[\frac{x}{2}\right] - \text{Log}[x] \quad \text{if } \text{Re}[x] > 0 \&\& \text{Im}[x] == 0$$

In[160]:=
```
exprR = Integrate [(1 - BesselJ [0, t]) / t, {t, 0, x}]
```

Out[160]=
$$\frac{1}{8} x^2 \text{ HypergeometricPFQ } \left[\{1, 1\}, \{2, 2, 2\}, -\frac{x^2}{4}\right] \text{ if } \text{Re}[x] \geq 0 \&\& \text{Im}[x] == 0$$

In[161]:=
```
N[ReplaceAll [exprL - exprR , {x → 1}]]
```

Out[161]=
```
0.
```

In[162]:=
```
N[ReplaceAll [exprL - exprR , {x → 2}]]
```

Out[162]=
```
0.
```