```
In[1]:= g[t_] = (ϵ / π)/(t^2 + ϵ^2);
        IntegrandV[s_]  =  g[t - s]/Sqrt[s^2 - α^2];
        IntegrandW[s_]  =  g[t - s]/Sqrt[α^2 - s^2];

In[4]:= Z = Sqrt[α^2 + (ϵ - ⅈ t)^2 ];
        Zconj  =  Sqrt[α^2 + (ϵ + ⅈ t)^2 ];
        (* V: the inside of Re() and its conjugate *)
        Vin[s_] = 1/(π Z) (-Log[ϵ - ⅈ (t - s)] + Log[α^2 - (t + ⅈ ϵ) s - ⅈ Z Sqrt[s^2 - α^2] ]);
        Vconj[s_] = 1/(π Zconj) (-Log[ϵ + ⅈ (t - s)] + Log[α^2 - (t - ⅈ ϵ) s + ⅈ Zconj Sqrt[s^2 - α^2] ]);
        V[s_] = 1/2 (Vin[s] + Vconj[s]); (* real part *)
        (* verify that V is the antiderivative of IntegrandV *)
        FullSimplify[D[V[s], s] - IntegrandV[s]]

Out[9]= 0

In[10]:= (* W: the inside of Im() and its conjugate *)
         Win[s_] = -1/(π Z) (-Log[ϵ - ⅈ (t - s)] + Log[α^2 - (t + ⅈ ϵ) s + Z Sqrt[α^2 - s^2] ]);
         Wconj[s_] = -1/(π Zconj) (-Log[ϵ + ⅈ (t - s)] + Log[α^2 - (t - ⅈ ϵ) s + Zconj Sqrt[α^2 - s^2] ]);
         W[s_] = 1/(2 ⅈ) (Win[s]  -  Wconj[s]); (* imaginary part *)
         (* verify that W is the antiderivative of IntegrandW *)
         FullSimplify[D[W[s], s] - IntegrandW[s]]

Out[13]= 0
```