WolframAlpha computational knowledge engine

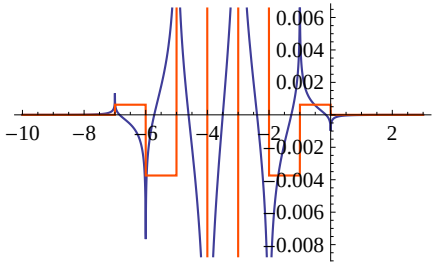
Integral(1/(x(x+1)(x+2)(x+3)(x+4)(x+5) (x+6)(x+7)))dx

Indefinite integral:

$$\int \frac{1}{x\,(x+1)\,(x+2)\,(x+3)\,(x+4)\,(x+5)\,((x+6)\,(x+7))}\,dx =$$

$$\frac{1}{5040}(\log(x) - 7\log(x+1) + 21\log(x+2) - 35\log(x+3) +$$
$$35\log(x+4) - 21\log(x+5) + 7\log(x+6) - \log(x+7)) + \text{constant}$$

Plots of the integral:



(x from −10 to 2)

real part
imaginary part

Alternate forms of the integral:

$$\frac{1}{5040}(\log(x) - 7\log(x+1) +$$
$$7\,(3\log(x+2) - 5\log(x+3) + 5\log(x+4) - 3\log(x+5) + \log(x+6)) - \log(x+7)) + \text{constant}$$

Alternate form assuming x is positive:

$$\frac{\log(x) + 21\log\left(\frac{x+2}{x+5}\right) + 7\log\left(\frac{x+6}{x+1}\right) - \log(x+7) + 70\coth^{-1}(2x+7)}{5040} + \text{constant}$$