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Limit[ (-1)^s (a-1)^s LerchPhi[a, 1-s, 0], a -> 1]
Limit[ (-1)^s (-1+a)^s PolyLog[1-s, a], a -> 1]
Limit[ (-1)^s (a-1)^s LerchPhi[a, 1-s, 0] /. s -> 5, a -> 1]
24
Limit[ (-1)^s (a-1)^s LerchPhi[a, 1-s, 0] /. s -> 8, a -> 1]
5040
Limit[ (a-1)^s LerchPhi[1/a, 1-s, 0] /. s -> 5, a -> 1]
24
Limit[ (a-1)^s LerchPhi[1/a, 1-s, 0], a -> 1]
Limit[ (-1+a)^s PolyLog[1-s, 1/a], a -> 1]

Expand[Limit[ (-1)^s n (a-1)^s LerchPhi[a, 1-s, Log[a, n]] /. s -> 5, a -> 1]]
24 n - 24 n Log[n] + 12 n Log[n]^2 - 4 n Log[n]^3 + n Log[n]^4
Expand[Limit[ (-1)^s n (a-1)^s LerchPhi[a, 1-s, Log[a, n]] /. s -> 3, a -> 1]]
2 n - 2 n Log[n] + n Log[n]^2
Expand[Limit[ (-1)^s n (a-1)^s LerchPhi[a, 1-s, Log[a, n]] /. s -> 2, a -> 1]]
n - n Log[n]
Expand[Limit[ (-1)^s n (a-1)^s LerchPhi[a, 1-s, Log[a, n]], a -> 1]]
Limit[ (-1)^s (-1+a)^s n LerchPhi[a, 1-s, Log[n]/Log[a]], a -> 1]

Expand[Limit[ n (a-1)^s LerchPhi[1/a, 1-s, -Log[a, n]] /. s -> 5, a -> 1]]
24 n - 24 n Log[n] + 12 n Log[n]^2 - 4 n Log[n]^3 + n Log[n]^4
Expand[Limit[ n (a-1)^s LerchPhi[1/a, 1-s, -Log[a, n]], a -> 1]]
Limit[ (-1+a)^s n LerchPhi[1/a, 1-s, -Log[n]/Log[a]], a -> 1]
Expand[Limit[ n (a-1)^s LerchPhi[1/a, 1-s, -Log[a, n]] /. s -> 3, a -> 1]]
2 n - 2 n Log[n] + n Log[n]^2
Expand[Limit[ n (a-1)^s LerchPhi[1/a, 1-s, -Log[a, n]] /. s -> 4, a -> 1]]
6 n - 6 n Log[n] + 3 n Log[n]^2 - n Log[n]^3

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$$\text{Sum}[z^n / (n+a)^s, \{n, 0, 0\}] + \text{Sum}[z^n / (n+a)^s, \{n, 1, \text{Infinity}\}]$$