Solutions

December 2021

1. $\frac{x^{e-1}}{e-1}$
2. $\frac{\pi}{2^{209}} \prod_{n=0}^{209} (2n+1)$
3. $\frac{1}{6}$
4.
5. 0
6.
7.
8.
9.
10.
11.
12.
13.
14.
15. $x + \frac{2}{\tan(x/2)+1}$
16. $\frac{\pi}{2} + \sum_{n=0}^{\infty} \ln(\sin(\arctan n))$
17.
18. $\sqrt{x(1-x)} + \frac{\arcsin(\sqrt{x})}{2}$
19.
20. $\frac{1}{4}\sinh(2\cosh^{-1} x) - \frac{1}{2}\cosh^{-1} x$
21.
22. $\frac{\pi}{8}\ln 2$
23. $-\frac{\pi^2}{8}$
24. $-\arcsin(x)\sqrt{(1-x^2)} + x$
25.
26.
27.
28.

29. $\frac{1}{e-1}$
30.
31. $2 - \frac{\pi^2}{6}$
32.
33.
34. 2
35. $eW(e) - e + e^{W(e)} - 1$
36.
37.
38.
39. $\frac{1}{\sqrt{2}} \left(\arctan(\sqrt{2} \tan x - 1) + \arctan(\sqrt{2} \tan x + 1) \right)$
40.