THE UK UNIVERSITY INTEGRATION BEE 2022/23

$$\int$$

OXFORD MARK SCHEME

Friday, 20 January 2023

Sponsored by

1. $\sin(1)$
2. $\dfrac{x^{e-1}}{e-1}$
3. e
4. e^{e^x}
5. $\ln(4)$
6. $\dfrac{\ln 2}{a}$
7. $\dfrac{\pi}{4}$
8. 1
9. 0
10. $\dfrac{\pi}{4}$
11. $1+\dfrac{\pi}{2}$
12. $\dfrac{\pi^2}{4}$
13. $\dfrac{\pi}{4}\ln(3)$
14. $\ln x + \ln 2 \log\log x$
15. $\dfrac{(2n)!}{4^n n!}\dfrac{\sqrt{\pi}}{2}$
16. $\dfrac{3\pi}{128}$ (they may have Gamma values, check if they're equal)
17. $\dfrac{\sqrt{\pi}}{2}$
18. $\dfrac{\pi \sinh^{-1}(b)}{2}$
19. $\dfrac{\pi^2}{12}$
20. $2\zeta(3)$
21. $\pi \ln 2$
22. $\dfrac{1}{\sqrt{2}}\arctan\left(\dfrac{x-x^{-1}}{\sqrt{2}}\right)$
23. $\arctan(a)$
24. $\dfrac{1}{2}$
25. $\dfrac{\pi^3}{8}$

26. $\pi \operatorname{sech}\left(\frac{\pi}{2}\right)$

27. $\frac{\pi}{4}$

28. $\ln\left(\frac{\pi}{2}\right)$

29. $\pi \sin^{-1}\left(\frac{1}{3}\right)$

30. $\frac{\ln 2}{2} + \frac{\pi}{4} - 1$