

THE UK UNIVERSITY
INTEGRATION BEE

2022/23



ROUND ONE MARK SCHEME

1. $\frac{\pi}{2}$
2. $2 \tan(x) + C$
3. $\frac{4}{3}$
4. $2xX + C$
5. 0
6. $e^5 \sqrt{\pi}$
7. 1
8. $\frac{3}{2 \ln 2}$
9. $\ln 2$
10. $\arctan(a)$
11. $\ln \left(\frac{2}{\sqrt{3}} + 1 \right)$
12. 626
13. $\frac{1}{5}$
14. -1
15. $\frac{\pi}{3}$
16. $\ln(x) - \frac{1}{22} \ln(x^{22} + 1) + C$
17. $e^{\frac{\pi}{2}} + 1$
18. $\frac{1}{\pi^2}$
19. $\frac{\pi}{8}$
20. $\frac{1}{4}$
21. $x - \frac{\ln \left(1 + \left(\frac{2024}{2023} \right)^x \right)}{\ln \left(\frac{2024}{2023} \right)} + C$
22. $\frac{24}{5}$
23. $\frac{\pi}{6}$
24. $\frac{\pi}{2}$
25. $e + \frac{1}{2}$

26. $\pi\sqrt{3}$

27. $\frac{1}{2}$

28. 9

29. $\frac{\pi^2}{48} + \frac{1}{4}\ln(2)^2$

30. π