

THE UK UNIVERSITY INTEGRATION BEE

2021/22



ROUND TWO GROUP ROUND

Saturday, 20 November 2021



UNIVERSITY OF
CAMBRIDGE

Sponsored by



Jane Street

1. $\int_0^1 \arctan^2(x) dx$
2. $\int_2^\infty \ln\left(\frac{\lfloor x \rfloor^2 - 1}{\lfloor x \rfloor^2}\right) dx$
3. $\int_0^\pi \frac{dx}{(2 + \cos(x))^3}$
4. $\int_0^\pi \ln(\sin x) \cos^3(x) dx$
5. $\int \frac{t^2 + 1}{t^4 + 1} dt$
6. $\int_0^\infty \frac{\sin ax \sin bx}{x} dx$ for $a > b > 0$
7. $\int_0^\infty \frac{\arctan(x)}{x^{\ln x + 1}} dx$
8. $\int_0^{\frac{\pi}{4}} \sqrt{\tan x} \sqrt{1 - \tan x} dx$
9. $\int_0^\pi \frac{x \sin x}{3 + \cos^2 x} dx$
10. $\int_0^\infty \sin(x^2) dx$