

# THE UK UNIVERSITY INTEGRATION BEE

2022/23



## ROUND 2 GROUP ROUND

Monday, 6 February 2023



Sponsored by



**Jane Street**

1.  $\int_0^1 \frac{1}{x} - \cot(x) dx$
2.  $\int \frac{x^n}{1 + x + \frac{x^2}{2!} + \cdots + \frac{x^n}{n!}} dx$
3.  $\int_0^1 \int_0^z \frac{\ln(1-u)}{u} du dz$
4.  $\int_0^{\frac{\pi}{2}} \frac{1}{(\cos x + \sin x)^2} dx$
5.  $\int_1^\infty \frac{(-1)^{\lfloor x \rfloor}}{x} dx$
6.  $\int_0^\infty \frac{dx}{(x + \sqrt{1+x^2})^2}$
7.  $\int_0^1 \ln(x) \ln(1+x^2) dx$
8.  $\int_0^{2\pi} \frac{\sin(24x)}{\sin(x)} dx$
9.  $\int_0^\infty \frac{\ln(1-x+x^2)}{(1+x^2) \ln x} dx$
10.  $\int_{-\infty}^\infty \frac{\arctan(e^x)}{\cosh(x)} \cdot \frac{\tanh(\frac{x}{2})}{x} dx$