

THE UK UNIVERSITY  
INTEGRATION BEE

2021/22



**ROUND TWO GROUP ROUND**

Saturday, 20 November 2021

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.  $\int_0^\infty \sin(x^2) dx$